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CEYLON: ITS BOTANIC GARDENS; VEGETATION AND SHORT REPORT ON A JOURNEY TO CEYLON.*

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(*Concluded.*)

BADULLA, a small inland place, lies at an elevation of some 2,200 feet, on the eastern side of the principal mountain group of the island. It is more dependent, as regards rain, on the north-east than on the south-west monsoon; that is to say, the climate there is considerably drier than that of places at a similar height situated on the western side of the mountains. Messrs. Sarassin call Badulla a big oasis in the unfruitful patana region. The branch of the botanic garden at Peradeniya established there is, consequently, to put it briefly, a kind of experimental garden for the drier mountain regions. When one considers that our visit took place in the end of June (the 28th), and that June and July are the months of the year when the least rain falls upon the place, it is not to be wondered at that the drought, when we were there, had caused its influence to be felt appreciably on the plants. Moreover at the beginning of the year difficulties had been experienced in obtaining the needful water.

A certain number of fruit-trees, for which the drier climate is suitable, were in good condition, namely varieties of *Citrus*; also some ornamental plants and flowering plants looked satisfactory. Among the trees we were specially struck by a fine specimen of *Sapium biglandulosum*. There is in the garden only a Sinhalese overseer; this produces, as regards care and upkeep of the plantation, the same difficulties that we know in Java, through exclusive native supervision over places situated too far away for continued European control. At the end of 1899 the present overseer ("conductor") will be replaced by someone else, on which occasion it is intended to effect some changes in the garden and in the method of working.

The garden at Badulla has various fruit-trees available, as well as eight varieties of palms, ten to fifteen ornamental trees and of "economic trees and plants": *Bixa orellana (glungem)*, rameh, oils palm, coca, Para rubber, Ceara rubber, and nutmegs.

Before the railway was laid over the high mountain pass, to get from Badulla to the similar mountain garden of Hakgala one followed the post-road. Since the distance comprises thirty miles and one has therein to climb 3,690 feet, it is now simpler to return by mail-coach to Bandarawela. From there one goes back over the portion of the mountain railway, that is so beautiful, by train, to the station of Nanuoya situated at 5,290 feet, where one has to get out in order to reach farther on by carriage the justly-famed plateau of Nuwara Eliya.

After only 3½ hours' rail one is again transported from dry Bandarawela to the moist mountain climate of the westerly mountain slopes. In mist and rain we rode in three-quarters of an hour from Nanuoya to Nuwara Eliya, where the weather was much better and at once tempted us to a walk; "walk" in this sense, that, clad in European costume, one had to assume a brisk pace in order to get warm.

The plateau of Nuwara Eliya, situated at 6,300 feet above the sea, is, although a great part of it is quite flat, not entirely horizontal; there are more or less pronounced slopes, without great declivities however. It is a large plateau surrounded for a con-

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siderable part by mountain tops, among others by Pidurutalagala, the highest summit in Ceylon (8,280 feet).

With its well-laid-out and excellently-kept driving and walking roads, big lake, wide racecourse, admirably managed hotels and number of villas lying up against the mountain slopes, their roofs modelled after the European fashion with chimneys piercing through the green, the whole aspect reminds one of a small watering-place in Europe. Solitary specimens of the handsome flowered *Rhododendron arboreum*, having their origin in the adjacent patanas, in many places adorn the sides of the roads, in other parts one encounters extensive thickets, composed of the oddest combinations of European, Japanese and especially Australian shrubs and trees (especially many acacias), whilst in the neighbourhood of the dwellings a profusion of European plants (heliotropes pelargoniums, pinks, mignonettes, roses &c., &c.,) blaze with a glory of flowers. Though neither of us very friendly to a stay, such as is usually enjoined in our higher Javanese mountain regions, both my travelling companion and myself were under the influence of the special stimulus of the *ensemble* at Nuwara Eliya, and that although we were not there in the good season. As such however are said to be the months of December, January and February, when it freezes somewhat in the night and is bright sunny weather in the daytime. The mean temperature throughout the whole year varies between 13·5 and 15 degrees c. 56·3 and 59F.)

In the good season a number of visitors come from near and far to Nuwara Eliya, to spend some time there. The growing fame of this plateau must to a considerable extent be explained by this, that the fact has there been grasped, by the building and arrangement of dwellings, clothes, food, comfort &c., of how it is necessary to live, so that one indeed experiences the refreshing, exhilarating influence of the mountain climate, with its surrounding country reminding one of beautiful regions in Europe, but kno how to guard oneself against the unpleasant and harmful effects of such a climate, asserting themselves at other seasons and hours, by the mode of living, just as well as one knows how to do at home on bright spring and autumn days.

Although Nuwara Eliya is generally called a "sanatarium," it is self-evident, that the climate there is not suited to some invalids. Indeed I do not think I mistake in saying that the chief value, from a hygienic point of view, of a place like Nuwara Eliya lies in the preventive favourable influence of the climate. It tends to conserve the energy, briskness and love of life of Europeans who for the greater part of the year must live in warm regions, and are only seldom in a position to obtain the desired refreshment of body and spirit by a journey to Europe. That especially in this last respect a stay on a plateau in the tropics, however well it may fulfil all requirements, cannot entirely take the place of a residence in Europe is self-evident. But, when one considers, that in the "season" months at Nuwara Eliya some 3,000 visitors come together from relatively neighbouring countries and not entirely from Ceylon, it is equally evident that one can complain very little of the entire absence of that peculiar psychic stimulus contained in the temporary removal of oneself to an entirely different environment, the meeting of various persons from entirely different countries and with entirely different aspirations, in short a sojourn in a centre not infused with the every-day spirit.

Though the reputation of Nuwara Eliya is now continually extending, it must not be thought that the beginning was not difficult. The contrary is the case. Naturally the difficulties had to be overcome of the site, from the nature of the case, with such a high-lying plateau, not easily attainable. Even more opposition was found in the common human inclination that is *not* diminished in intensity by a residence in the tropics, in the case of every new thing, to look by preference at the dark side, and, by wishing for medals without a reverse, to hinder the carrying out of every new idea.

A former energetic governor, Sir William Gregory, to whom Ceylon is much indebted, among other things, in spite of all real and fictitious difficulties, took vigorously in hand the development of Nuwara Eliya. To him is due the lake, which, by the induction of a stream, was artificially called into life, and which now, perfect as if due to nature alone, adds so much to the attractiveness of the landscape. Sir William Gregory's predecessor, who was pigheaded with regard to the attempts to bring Nuwara Eliya to the front, was, so runs an anecdote, when he heard of the plan of his successor to make a lake there, so convinced of its impossibility that he declared himself ready in his own august person to drink up all the water that should come into the projected lake? And eleven years ago an English member of Parliament, who wrote an account of a journey round the world,—whose style it is true seemed generally to incline towards the pessimistic, —had not a single word of appreciation or praise but only persiflage and ridicule for all that was then already completed at Nuwara Eliya.

That those who, in the matter of sanataria and "air-cure resorts," want by choice "five feet on a sheep," do not allow criticisms of it to be lacking needs no demonstration.

But, in spite of all opposition and criticism, the development of Nuwara Eliya was proceeded with in Ceylon, and, after the overcoming of difficulties without number, one can now point there with pride to the Ceylon "sanatarium." *E pur si muove*! There is business-there; and it is daily increasing. During our stay in the island not only was a proposal of the Governor's, to grant a considerable sum to Nuwara Eliya, for the carrying out of various improvements, unanimously agreed to by the Legislative Council, at its sitting of 29th June, but advantage was also taken of that opportunity by several members to set forth in terms mostly highly laudatory the great importance and utility of Nuwara Eliya.

This somewhat long digression on the Ceylon plateau that is becoming increasingly more famed, is here, inserted purposely, because with us an attempt has begun to bring into existence something like what has taken place there. I lack the qualification and the data both to decide if the plans developed for Java offer more or less chance of success, and if there are present corresponding conditions which should promise as good a result as that attained at Nuwara Eliya. *One* conviction, however, I have brought with me from Ceylon by my own observation and by explanation and information obtained, namely that, whenever it should appear possible to call into being upon a plateau in Java something resembling Nuwara Eliya, the execution of such a plan should be a *blessing* to our colony.

Six miles east of Nuwara Eliya lies the hill garden of Hakgala, the largest branch of Peradeniya. As such the garden has been conducted since 1882 only; before that (from 1869 onwards) the land was occupied by a cinchona plantation or experimental garden of the Government.

The position of the garden at Hakgala, at 5,800 feet elevation, is exceedingly beautiful. The conditions for the growth of most plants from cool climates are there in general favorable. Off and on however they have had to suffer there, now from periods of too great drought, then again from phases when too much rain falls continuously, and there is too little sun. By chance both the one and the other were experienced in 1898. A worse disadvantage—because it happens regularly—to Hakgala as a place suitable for a botanic garden is the constant occurrence of severe winds that cause damage. This evil has under the present conditions been reduced to a minimum by the extraordinary and continuous exertions of the superintendent, Mr. Nock. It is

remarkable what exceptional results have been obtained in the sphere of cultivation by this zealous and capable manager. It is hardly credible that no where else in the tropics will one meet with such a rich collection of flowers indigenous to temperate climates, in number of species and varieties, as that which one is able to see at Hakgala. That the *Eucalypti* and other Australian trees thrive well there is due to the climate; varieties of *Cupressus* also grow well there. Fine specimens of tree-ferns, both indigenous to Ceylon and to New Zealand and Australia, also attract attention. In the lawns stand handsome specimens of *Bocconia frutescens*, whilst a large and well-grown example of *Pinus longifolia* strikes the eye by its dimensions.

In the last annual report the mention of the one that was observed in the botanic garden at Penang gave occasion for a brief consideration of our hill garden at Tjibodas; something similar is now, on the ground of the visit to Hakgala, once more the case.

Both the hill gardens, Hakgala and Tjibodas, are capable, as regards the object aimed at, of only a very limited comparison. The very great importance that, from a scientific point of view, attaches to Tjibodas as a station for the trial of the luxuriant flora of a primeval tropical hill forest is not to be sought after at Hakgala, because in that respect, the conditions there are in no wise so favourable as in our hill garden. Nevertheless the Ceylon hill garden can, in other respects, serve as an example to ours. In the first place there leads to Hakgala a winding carriage road in excellent condition, so that the garden can be reached without difficulty. Herein a comparison with Tjibodas very far from turns in our favour, since we do not even possess an elementary cart road to reach our hill garden. As it is to be feared that even such a simple road must as yet continue to belong to the *pia vota*, we shall have to resign ourselves to the thought that scientific students who visit first the Ceylon gardens and then the Lands Plantentuin—as sometimes happens—will consider the accessibility of our mountain branch as not quite "up to date." Hakgala also surpasses Tjibodas in the state of upkeep of plantations and roads, which is intelligible when one knows that about 11,000 rupees a year are spent on the Ceylon hill-garden, for all expenses inclusive.

On 1st July we returned to Peradeniya, where another couple of days were spent at the head establishment, after which the undersigned, under the guidance of Mr. Willis, set out on the journey to the northern branch, that of Anuradhapura. Of this garden, which truly in comparison with the two hill gardens spoken of, those of Tijibodas and Hakgala, occupies a very inferior place, one can certainly not say that it is easily accessible. In order to get there one must first go in the evening by train to Matale, where one stays the night in an excellently managed resthouse, After this one proceeds the following morning by mail coach in order, if all the circumstances are favourable, to reach Anuradhapura twelve hours later. Indeed we might consider it fortunate that the journey was accomplished in the regulated time, nevertheless the chief impression of that journey may be best expressed by the well-known quotation from the "Camera obscura." "How hot it was and how far."

The first portion of the road goes through a well cultivated and not yet too dry region; one rides, among others, along extensive cacao plantations, that stand under very dense shade. According to what I was told, the planters have adopted that as a remedy against the attack of *helopeltis*; that they had thereby however fallen into the evil—and this view is very plausible—of having by too much shade helped the development of parasitic fungi. On behalf of the Ceylon planters Mr. J. B. Carruthers, a competent and energetic young English botanist, had spent some time in the colony in order to make a study of the parasites of vegetable nature that do harm to the cacao culture. Many a useful hint to the planters has already been the fruit of this investigation.

Further up one comes into the true dry region that embraces so large a part of North Ceylon. Long straight roads over a gently undulating plain lead through a comfortless, monotonous, unfruitful and sparsely populated region, covered with brush-wood and low trees. And yet in earlier times this was different. Some 2,000 years ago Anuradhapura was the great and populous capital of Ceylon; in the vicinity were then found gigantic works of art, namely enormous water reservoirs—more strictly speaking artificial lakes—which by means of regular irrigation had to guarantee the fertility of the region. Of all this there remains nothing more than extensive portions becoming marshy or evaporating puddles, where thousands and thousands of herons, storks, ibises, plovers, cormorants and a host of other waterfowl alone have sway.

Towards the fall of the evening we reached Anuradhapura, where, on a large plain, surrounded by strange and fantastic ruins and buildings, no longer easily to be discerned in the gloaming, crowds of pilgrims with hundred of lights and lamps had pitched their camps in the most picturesque confusion near their carts and unyoked oxen. In a resthouse that, as regards accommodation and cleanliness, can easily compete with most of our Java hotels, and far surpasses our *pasangrahans*, we found a very grateful shelter.

The little Garden at Anuradhapura was begun in 1885, with the object of making of it a sort of culture garden, especially for those tropical plants that do not bear a moist climate well and prefer drought and heat. Just in the year in question the drought was so severe, that several plants in the garden died, both trees and shrubs and herbs, which have since been as far as possible replaced by new specimens. A considerable portion of the labor force must be utilized in the middle of the year for bringing water and watering. That under such unfavourable circumstances the condition of the plantation is not flourishing is evident. Moreover the overseer can be but little controlled owing to the great distance—through troublesome communication—that separates Anuradhapura from Peradeniya. The difficult communication carries with it also the evil, that useful plants which, according to experiments made in the garden, will thrive well under the existing climatological conditions, as for example cotton, nevertheless as yet afford no opportunity for distribution for planting on a large scale, because the cost of transport of the product is too high. For the time being there is therefore not much to say about the little garden at Anuradhapura. When however the projected railway connection shall have opened an easy communication with the south of the island, and greater certainty of water supply is arrived at, then it will be possible to propagate a larger number of useful plants, fruit trees and others, in the garden at Anuradhapura and distribute them from there in the neighbourhood.

The place could not be left without a visit to a great botanic curiosity, which, together with the ruins and the dagobas, is the object of the crowds of Buddhist pilgrims, who, especially at certain times of the year, stream towards Anuradhpura. I refer to the sacred bo-tree (*Ficus religiosa*), regarding which its seems to be known with certainty that it was planted 288 years before our era by a certain King Dewanampiyatissa. Of this tree nearly 2,200 years old—probably the oldest of all trees upon our earth of which the age is known—some portions are still, surrounded by a high enclosure and carefully guarded by Buddhist priests, living, whilst in addition several of its off-shoots, also of a respectable age, grow vigorously inside an outer wall that separates the holy place from the outer world.

Had it not been our intention to become personally acquainted with all the branches of the botanic

garden in Ceylon, it is doubtful if the visit to the little gardeu at Anuradhapura was worth the tedious journey there and back. The expedition however in other respects fully rewarded us. In the first place because the place is so remarkable from an archaeological point of view, that the visit even for a layman is exceptionally interesting. In the second —and this has directly to do with the province of the writer of this—because it affords an opportunity of forming a good idea of the extensive dry northern Ceylon, which differs both botanically and economically so markedly from the better known southern portion of the island.

Yet one last "bye-garden" remained to be seen, namely, that of Henaratgoda, situated at about sea-level, at a distance of 16 miles from Colombo, a twenty minutes' ride from the station of the same name. In my visit to this branch, which thus, in strong contrast with Anuradhapura, has a warm but at the same time equably moist climate. Mr. Willis had the great kindness to again act as my guide by coming down specially for that purpose, some days after our return from the north of the island, whilst I came from the adjacent Colombo.

The Garden at Henaratgoda, which covers an area of 39 acres, was commenced in 1876, specially for the cultivation of caoutchouc-yielding plants imported from South America. Although many other plants worthy of observation are met with in this garden, among others a young but fine specimen of *Lodoicea Sechellarum*, and many cultivated plants grow very well there, still the chief attraction of this branch remains the caoutchouc-yielding trees, and more especially the Parà rubber-producing *Hevea brasiliensis*. Of this useful tree one meets at Henaratgoda with such fine and vigorous specimens, that this alone amply repays the trouble of a visit. Here also practice demonstrates the same as on the cultivated plant portion of the botanic garden at Singapore, namely, that the *Heveas* need a warm and moist climate and specially a moist soil in order to grow well and vigorously

An enforced postponement of our return voyage for several days—in consequence of a fear of eventual quarantine in connection with the plague in British India—was utilized by us in obtaining, both by a journey to Point de Galle and in Colombo itself, some data regarding export products of vegetable origin. These data were obligingly furnished, or at least the way indicated how to obtain them, by the Netherlands Consul at Colombo, Mr. Wennink, to whom once more a word of grateful thanks must be offered for the general help and friendly guidance afforded to us.

Especially in the districts round Point de Galle much is done in the culture of Citronella Grass, of the oil of which in the first half-year of 1898 no less than 594,433 pounds were exported from Ceylon. And the cultivation of this grass is further increasing, as was told me on credible authority. For Europeans, in Ceylon at least, the cultivation of citronella grass and the preparation of the oil does not pay. A European proprietor, living 15 miles from Point de Galle, who occupied himself therewith and extracted the product properly, certainly obtained higher prices than the native people for the citronella oil prepared by him, but nevertheless had to give up the business. That locally not much profits is to be made from it is proved by the following figures, which were furnished to me there. In the first two years there is no crop; then every year for a space of ten to twelve years. Then the grass can be cut four to five times a year. From each cutting is obtained 16 to 20 bottles of citronella oil per acre (bottles of 22 English ounces). For this oil the native producer gets 85 cents a bottle, while his total expenses of production come to 70 cents a bottle. Thus under the most favourable circumstances the profit obtained amounts per annum to 15 rupees per acre.

It must be borne in mind, that all these figures as well as the following statement refer to 1898, and that they rest partly upon verbal communications of very experienced persons.

The export of all kinds of products of the Coco palms is very considerable, which is not to be wondered at, since from Colombo to Point de Galle one rides continuously through such enormously extensive and fine coco plantations, that one understands how even a Junghuhn can declare never to have met with anything like it in Java and Sumatra. The shipment of coconuts as such (from the ports of Colombo and Point de Galle together) remained about constant in the years 1895, 1896, 1897 and 1898. In the last half of 1898 there were shipped some 5 million nuts. The export of "desiccated coconut" also remained nearly the same in recent years (with the exception of 1896, when much more was exported), namely 5 million pounds per half-year in the years 1897 and 1898. This dried coconut is packed in tin, in packages of half-a pound. Whilst of coconut oil in the first half-year of 1895 there were exported 143,329 cwt., in the first half of 1898 it had already risen to 177,282 cwt. Nevertheless the comparison of the figures for copra for the same years gives the astonishing result that in the first half of 1895 only 4,692 cwt. were exported, and from 1 Jan. to 28 June 1898, 176,211 cwt. In addition the export of "pouac"—the resultant of the copra after the extraction of the oil, which is sent in cakes to Europe for cattle food—increased in the same period from 83,560 to 101,184 cwt.

Of the fibres of the coconut, brought into the market, according to the method of preparation and treatment, under the three categories of "rope," "yarn" and "fibre," there were exported in the first half-year of 1898 respectively 5,785 ; 30,984 and 43,678 cwt ; quantities that, compared with the first half of 1895, taken all together, remained almost the same.

The rope is made by the natives with hands and toes and brought on the market in 14 numbers. Attempts to manufacture this produce by machinery have so far not succeeded; the preparation of the *fibre* however is carried out by Europeans in Colombo.

The coconut oil is prepared by the native people in the most primitive mills, worked by oxen or buffaloes. In the installations in Colombo it undergoes a further purification, by filtration, before being shipped. The careful measures that have to be taken against leakage and also, as I remember well—the higher freights, cause the export of copra and that of coconut rope to be more profitable than that of the oil.

In conclusion it may be mentioned that from the coconut, arrack is prepared (although that article does not appear in the export statistics accessible to me.) At Moratuwa a place situated on the railway to Point de Galle, at about 17 miles from Colombo, is an arrack distillery in which, as my informant told me, millions are earned.

From the very great importance that all these products of the coconut have for the trade of Ceylon it is not to be wondered at, in travelling by rail to Point de Galle and in the vicinity of that place, one is struck by the evident prosperity of the population. Matara, a place yet further than Point de Galle and almost at the southern most point of the whole island, is known as the residence of many rich Sinhalese families of the lowlands.

Of Cinnamon there was exported in the first half of 1898 altogether (in "bales" and "chips") about one-and-a-half-million pounds, that is some four hundred thousand pounds more than in the like period of 1894. In spite of this still fairly remunerative trade, there is, so I was told, only one European who occupies himself with cinnamon cultivation, because it is not profitable enough for the European planter. The prices are on an average about 50 rupee cents per pound, varying between 80 and 35 cents, according to the quality (from No. 1 to No. 5.) In recent years however the price

rose to a maximum of only 68 cents, while sixteen years ago the lowest prices—28 cents per pound—were realized. As has been said, the culture is still possible for natives with prices of 30 cents the pound. One reckons on an average annual return of 100 English pounds per acre and a maximum of 150 pounds. A certain quantity also—which is increasing—of cinnamon oil is exported, whilst from the leaves is prepared the "cinnamon leaf oil" that realizes 22 cents per ounce.

Of Cardamoms there was exported the quantity, that remained pretty constant during the last few years, of about half a million pounds per year, at prices varying for R1-6 to R2·2 per pound.

The export of Cacao, which is increasing, amounted in the first half of the year under report to 27,010 cwt., generally taken at 37 to 38 rupees per cwt., whilst there is one estate the produce of which fetched 55 rupees.

The export of Coffee from 1st Jan. to 28 June 1898 amounted to only 6,560 cwt: against 38,397 in the same period of 1895; that of Cinchona bark in the same time 395,716 pounds against 498,973 in 1895,

Ebony and Sapanwood are still exported, but in steadily diminishing quantities: in the first half of the year of report respectively 1,854 and 2,086 cwt.

Of fibres were also shipped, in the period in question, palmyra fibre (of *Borassus flabelliformis*) 15,768 cwt, and kitul fibre (of *Caryota urens*) 2,181 cwt., more certainly than in both the preceding years, but then somewhat like the export in the first half 1895. There may be mentioned, that the fibre of *Fourcroya gigantea* is not exported from Ceylon, although the plant grows excellently there, because no profit is seen in the prices obtained from the cultivation and preparation.

At the conclusion of these short data regarding the vegetable export products of Ceylon it may be repeated that of the chief of those products, tea, *in the whole year* 1898 were exported a trifle of 120 million pounds, being almost 4 million pounds more than in the preceding year.

Finally there remains just one word upon a subject totally different from the foregoing, namely, a visit to the Museum at Colombo.

It is a handsome building of two stories in front of which is a large lawn with a statue of Sir William Gregory, the former Governor of Ceylon, already spoken of. Commenced in 1877 in the so-called "Cinnamon Gardens," the Museum was reserved for all that Ceylon produces in products of agriculture and industry, minerals and gems, collections of natural history and ethnological as well as anthropological collections, as also for a library.

There is a special reason why the Colombo Museum is mentioned here; namely, the presence on the second floor of an exceptionally fine zoological collection, continuing to remain in an uncommonly good state, also entirely confined to the Ceylon fauna.

The present writer was also previously under the delusion that in a constantly moist tropical climate it is as good as impossible to preserve a Zoological Museum in only a tolerable condition. A visit to the zoological collections of the Museum at Colombo shows, in the most convincing manner, the injustice of this opinion. The collections look so good and well preserved and the mounting is so effective, that one could not find better in any single European Museum. This result, which cannot be too highly commended, was attained by continued expert oversight and particular maintenance. Such a zoological collection must be of specially great use for those that concern themselves in the natural history of the island, either from a purely scientific point of view or from practical interest.

It is certainly a matter of shame to us residents in Netherlands India that we have not been able to produce anything in any way like this.

The hope may perhaps be entertained, that within not too long a period we may get in Java a simple but well-kept Zoologica Museum maintained under expert supervision, and in that way, with our rich fauna and our so much more important island, no longer stand entirely behind Ceylon in the matter in question.

Such a Museum would for us be for two reasons of great importance. In the first place, because the number of zoologists that come to Java is steadily increasing; in the second, because a Museum such as that referred to cannot be otherwise than a guide of great value for all questions of practical moment, especially as regards agriculture.

On 15th July we once more embarked, in order to return to Buitenzorg *viz* Singapore, convinced of the great use that the visit to Ceylon had been to us. With the literally daily correspondence that the Lands Plantentuin has with foreign countries and the great number of foreign visitors that come there—both students of nature and persons dependent on or interested in agriculture and horticulture—it is, for him who has the honor to superintend the establishment, of the greatest value *to be able to learn by personal observation* what there is in other colonies in the same or in a similar domain.

Besides: if there is with us much, the superiority of which over that existing elsewhere may with justice be mentioned, that does not prevent the observations made abroad from being in not a few cases of service to our successors also, and the eye is opened to ways whereby and directions wherein service can be rendered in our case also, and to which presumably only very incomplete attention had been paid.

In conclusion thanks are tendered by the undersigned to the heads of the Department for the assistance rendered to him in the compilation of this report.

TREUB,

Director of the Lands Plantentuin.

Buitenzorg, July, 1899.

PLANTAINS AND BANANAS.

By Percy G. Wicken.

Inquiries having been made as to the method of cultivation, and the best varieties to grow in West Australia, the following notes may prove of interest to intending growers:—

The plantain usually attains a height of about 8 ft., and in favourable positions often reaching 12 to 15 ft., and the stalks a foot in diameter, it is one of the most striking instances of tropical fertility, growing in a few months to a size that takes other plants in cooler districts several years to attain. The plantain is to many thousands of people in the tropical islands what rice is to the Hindoos, rye flour to the Russian, and wheaten bread to the Englishman, it is their staff of life. It is claimed as a native both in the old and new world, and has been cultivated for ages in both hemispheres.

The banana is similar to the plantain, but the fruit is smaller. There are several varieties to be obtained in Western Australia, viz., the sugar banana, apple banana, pear banana, Cavendish or Fiji, and the Chinese banana; this latter variety is the one most likely to prove successful in the stretch of country between Perth and Geraldton. It is a comparatively dwarf species, the stem attaining a height of only 5 or 6 ft. Its robust and dwarf habit renders it particularly fit for exposed localities, and this is one of the reasons why it is so extensively cultivated in the South Sea Islands. It is early maturing, is not so exhausting on the land as the taller growing variety, and is very prolific.

This variety, as well as the plantain, should grow very well as far south as the Swan river, but it is not likely to give good results further south. There should be a good opening for several large plantations along the banks of the Swan river or the adjacent country, and having a market close at hand, the cultivation of this crop should prove a profitable undertaking. Between the Swan river district and

the Northern districts of the colony there should be plenty of spots where the cultivation of the banana might be undertaken on a large scale.

It has been found by experiment that the banana will live, if in proper soil, without injury to the roots, at a temperature as low as sixteen degrees Fahr, the stalk will stand a temperature of twenty-five degrees without injury, and the leaves are not wilted until the air is chilled to thirty degrees. Although the banana is stated to live at this temperature, it would not be advisable to plant out on a large scale unless the temperature is considerably warmer than that stated. The site for a plantation should be in a sheltered position, and as near as possible to a railway line or convenient water carriage so that the fruit can be carted cheaply to market, with as little handling as possible. When the site is decided upon the land must be cleared and should then be broken up and subsoiled as deep as it is possible to do it. Strong teams of bullocks are best to use for this purpose, one plough following the other and breaking up the soil in the same furrow without bringing it to the surface. The land then requires harrowing and rolling until in good order. If the land is low, and likely to be covered with water during the rainy season, it will require draining, and if too low for underground draining, open drains should be cut out with the plough at a distance of about one chain apart: the banana likes a rich, moist soil, but will not stand stagnant water.

The land should now be marked out into drills 15 ft., apart each way, and the young plants put in at each intersection of the drills, this will take 193 plants per acre. By planting on the square system we are able to keep the cultivation going between the rows until the plants are fully grown. The banana is propagated by suckers taken from the old plants that have fruited. Holes should be made in the ground deep enough to allow the roots to be placed in as deep as they were when taken from the parent plant. The suckers should not be removed from the parent plant until everything is ready for planting them out in their new home. The roots require planting as carefully, and in the same manner, as you would plant out a fruit tree, and the soil should be well packed round the roots. If the land between the rows is kept free from weeds, the plants will require no further attention except to replace any that may not have taken root. The shoots or suckers should be taken from the parent stem when from 2 to 3 feet high, their bulbs being divided from the principal bulb by means of a mattock. These slips are cut about 8 inches above the next, and placed in a slanting direction in the prepared holes, and covered with earth leaving in sight only about two inches.

The length of time which elapses between the planting of the slips and their fruiting depends on climate, situation, and variety of species.

During the first year a crop of maize, sorghum or other desirable crop may be grown between the rows, and will help to pay the expenses of keeping the land free from weeds; after the first year when the bananas begin to bear fruit, they will require the entire use of the land. The suckers will bear fruit from twelve to eighteen months from time of planting out.

After the bunches of fruit have been harvested, the stems should be cut down to the ground, and two or three of the strongest suckers left for successive cropping, all the weaker ones should be cut out or carefully taken up if wanted for new plantations. If properly cultivated and looked after a plantation will keep in good bearing for about seven years, but after that the yield is not satisfactory, and it is better to put the land under another crop. It is not advisable to plant bananas on the same land for some time to come, as it is likely to encourage disease, but a system of rotation of crops is always desirable.

The banana being a quick, rank growing plant, is naturally a gross feeder, and requires to be well supplied with manure, it requires principally nitrogen and potash. The best manure to use is well rotted stable manure, dead leaves, etc., that will supply plenty of humus to the soil, it should be applied as a mulch during the summer months to keep the soil moist, and then worked well into the ground with a hoe during the autumn. If artificial manure has to be used, a mixture of bonedust, kainit and sulphate of ammonia would give the best results, it should be mixed in the proportion of 200 lb. bonedust, 200 lb. kainit, and 100 sulphate of ammonia, and spread round the roots at the rate of about 3 lb. per plant; this would take about 5 cwt. per acre. It should be applied early in the spring.

The amount of fruit obtained from a plantation of bananas is enormous, 70 lb. of fruit often being obtained from a single plant twelve months after planting. A statement made by Humboldt, once thought exaggerated, that an acre of good land in the tropics covered with plantain would yield as much nutritious food as 144 acres of wheat, is now no longer denied or doubted.

A Sacramento grower, in recording his experiences as to how to grow bananas in the garden, says:—"My method has been to supply the richest food for this gigantic plant, and force it to its extreme growth. Everyone has old chip dirt, ashes, boots, shoes, clothes and manure which are often a nuisance. Dig a big hole, bury this up, in the centre of the mass place a pailful of sand and plant the fresh bulb. This is to preserve the dormant plant from the wire-worms and insects which will not attack the growing plant. As the plant grows, give it an abundance of water, and all the slops of the house. Any kind of manure, fresh or old, ashes, leaves and vegetables will soon disappear, and be absorbed by this gigantic king of plants. As the rainy season approaches, pile all the leaves and twigs of trees around the plants. It protects the bulbs and makes the soil rich for next season."

In addition to its use as a fresh fruit, the banana is of considerable value as an article of food when dried. In a dry climate, where there is plenty of sun, the fruits may be dried in the following manner:—They are exposed to th sun in bundles, and when they begin to wrinkle they are peeled, for the skin, if left on, causes a disagreeable flavor. They are kept for some time until an efflorescence of sugar appears on their surface, as on dried figs and prunes. They are then pressed in masses of about 25 lb. each and wrapped in leaves or else packed in boxes. These methods can only be adopted in countries where the climate is very dry. In others, recourse must be had to artificial means which are, unfortunately, more costly. There are three distinct ways in which the ripe banana may be dried—1st, exposing the fruit to an atmosphere of sulphric acid gas before the desiccation is begun; 2nd, boiling rapidly very ripe fruit in water which contains sulphate of lime; 3rd, by boiling it in syrup. By either of these, the albumen and caseine of the fruit coagulates, and the tendency of the banana to decay and ferment is stopped at a period favorable for desiccation. Experience shows that the second method is the best to employ in moist climates, without this precaution the fruit instead of drying becomes damp. To expose the fruit to the sun's rays after boiling, trays of bamboo or of any material which permits the free action of the air and light may be used. If rain falls they are dried in a furnace or an evaporator. The bananas when dry are pressed, and packed in boxes. Banana drying has been successfully carried out in Queensland. A meal is also made by slicing the banana,

drying in the sun, and then grinding into flour, it is very palatable, easy of digestion, and suitable for food for invalids and children.

Vinegar may also be made from the banana, when a glut occurs in the market.

The stem of the banana may be used in many ways, cattle and pigs both eat it with a relish, a starch is made from it, but the main use is for making fibre, and this is extensively carried out in Jamaica and other countries, Manila hemp and cordage are made from a species of banana, and over £1,500,000 worth are imported into the United Kingdom annually from the Phillipine Islands.—*Journal of the Department of Agriculture of Western Australia.*

TOBACCO.

A trial was made of a small area planted in tobacco at St. Clair in 1898-99. This produced a crop of tobacco which was of inferior quality, but nevertheless sold at a fair price in the local market. Most of the tobacco grown in the Siparia district of Trinidad, although cured after the Cuban fashion by a native of that Istand, is characterised by the presence of a musty flavour which destroys its value. The texture of the tobacco is good, it burns well, and it would not be deficient in flavour if the musty character could be eliminated. The Cuban leaf, however, appears to be too thin for our climate, for in wet weather, the leaves becomes spotted and useless. Again, many native growers who do not follow the Cuban plan of curing, add to this fault by actually allowing a damp fermentation to take place, which has the result of rendering the tobacco leeves tender in places and generally inferior in quality.

Discarding mainly the Cuban variety in 1899-1900, another kind was planted, which was grown from seed furnished by a correspondent. This variety has proved itself much stronger in habit, and the leaves on being cured have given good sound tobacco of full flavour and aroma. Further experiments are to be carried on next season. The main feature of the experiment was that the seed was sown so that the crop ripened in the dry season of February and March. In these months the curing can be carried on with more security from the attack of mould fungi, and a better sample results.

I am confident if growers could only be persuaded that tobacco does not require a damp fermentation, but should get what is known as fermentation only, a much better tobacco could be put in on the market. As described, our process (which is practically that followed in Cuba) is to cut the leaves in pairs and hang up under cover until the mid-rib of the leaf is well dried and the leaf itself crisp and easily broken if handled in the driest part of the day. When this stage is reached, the leaves are packed into hands of some 10 or 12 leaves together, and again allowed to dry for a few days. This operation should always be done early in the morning when the leaves are limp and soft from the night air, but they should never be handled when crisp dry at mid-day. When all the leaves are ready they should then be tightly packed into a stout box and turned once a fortnight for some three months, when they should be sufficiently cured for manufacture. At no time should the bulk of the package appear damp to the hand, or even to develope heat above the normal temperature, more than by one or two degrees.

Concisely stated, tobacco seed sown in September, planted in November, harvested in February, and dried and put to cure a month later. Turn every two weeks, turning sides to middle each time, cover with dry banana leaves, and put on cover with weights to keep the bulk closely together.

Anyone following this plan will be sure to get a tobacco which will sell and give a good return. Our crop gave 800 lbs. to the acre, and is estimated to be worth not less than 12 cents per pound in the local market. The principal expenditure is for the labour; the picking caterpillars morning and evening being very expensive—but a return at the rate of £21 per acre will more than provide for this, and leave a good a good margin for the planter.—*Trinidad Bulletin.*

RATIONAL MANURING.

In our remarks on the above subject published in March last, we dwelt mainly on the value of potash and nitrogen, and stated that a manure containing an excess of nitrogen will unduly increase the growth of leaf and straw at the expense of fruit or grain, and that, in order to avoid such a result, stable manure should always be supplemented by artificial fertilisers containing phosphoric acid and potash. These two ingredients however, should not be applied during the growing season, as their tendency is to injure the young plants and even the seed. We experimented on a bed of beans by applying these fertilsers when the plants were in full leaf, the result being that all of them rotted off at the surface of the soil. To avoid such a catastrophe, phosphoric acid and potash should be applied for some time (several weeks at least) before sowing, in order that their mineral fertilisers may become thoroughly incorporated with the soil. The reason which makes it imperative that phosphoric acid, in some form or another, be applied to the soil is clear enough. All our cultivated plants contain a large amount of phosphoric, acid, which is wholly derived from the soil. If the crops are removed either in the shape of grain, fruit, or green forage, then so much of this fertiliser is irrevocably withdrawn to build up the bony structure of the animals to which the crops are fed. Now, most soils are naturally deficient in the supply of phosphoric acid and what there is is so slowly available for plant food that it becomes an absolute necessity to supply it in a more readily assimilable form and in greater quantity. Seeing that the bones of animals are made up of phosphate of lime, it was concluded and rightly so, that ground bones would supply the want of phosphoric acid in the soil. The effects of an application of bonedust were so apparent that it was universally used by cultivators of the soil. When, however, the discovery was made that certain minerals would supply the necessary ingredient, the consumption of bonedust fell off, as it was found that Thomas's phosphate was not only cheaper than bonedust, but produced better results, and was much quicker in its working. Superphosphates also came upon the scene, and thus bonedust was practically discarded as an agent for replacing the phosphoric acid in the soil. In both these, the latter is very soluble, and is easily absorbed by growing plants. It may be interesting to those who use basic slag, or who see it mentioned in reports of experiments on crops, to know what it is. Steel is made from iron, but if the iron ore contains much phosphorus this ingredient has to be

removed, or the best steel cannot be manufactured. It is got rid of by burning to an acid. Subsequently it was discovered that by combining lime with this acid there was produced a substance called phosphate of lime. Now, this phosphate of lime, mixed with oxide of iron and some other refuse, floats on the top of the molten metal in the furnace, and is named basic slag. When it has been removed and cooled down, it is ground to powder, and thus an excellent fertiliser has been obtained from a substance useless to the ironfounder and the steel manufacturer—the waste of one industry becoming the support of another.

This particular Thomas's phosphate combines lime and phosphoric acid in the proportions of four to one, the lime being very soluble.

When bones are converted, by being dissolved in one-third of their weight of sulphuric acid, a superphosphate of great value is produced, a value such that one bushel of superphosphate is equivalent to four bushels of simple bonedust.

Other superphosphates are the produce of those phosphoric deposits found in the South of England consisting of masses of broken bones and teeth of prehistoric monsters—gigantic sea-lizards, whales, sharks; and also there are vast deposits of so-called *coprolites*, now supposed to be fossilised excrements of the animals themselves. Thousands of tons of these are annually ground up and converted into superphosphates for which there is an immense demand in the farming districts all over the world.

However, it is not our intention to give a list of phosphates or superphosphates, but we wish to impress upon agriculturists the absolute necessity of supplying the phosphoric acid demanded by field and garden crops, and of keeping up the supply. Consider what a quantity of phosphoric acid some crops require. Wheat requires 60 lb. per acre; beans, peas, &c., 80 lb.; some oil-producing plants 90 lb.; and small fruits 100 lb. Now, these quantities must be replaced, and stable manure alone is unable to furnish them; therefore if heavy crops are demanded from the soil, it follows that an artificial manure, in addition to the stable dung, is imperative. Here is a very clear statement showing the comparative phosphoric value of stable dung and Thomas's phosphate: 100 lb of hay demands from 1 lb. to 1¼ lb. of phosphoric acid, 100 lb of stable dung contain only 2½ oz to 4 oz of the ingredient, so that it would require 600 lb of it at least to furnish the phosphoric acid for 100 lb of wheat, whereas, by using the artificial fertiliser-phosphate or superphosphate, 1^0 lb. would be enough for 1,600 lb. of wheat.—*Queensland Agricultural Journal.*

MANGOES.

In article No. 308 published in the issue of the Bulletin for July, 1899, it was stated as follows:—"There are several other mango trees in the Garden which will probably prove worthy of record later when they have been sufficiently examined."

During the end of last season several mangoes were examined, and out of these seven have been selected for record, the figures and descriptions of which are now given. It has been thought advisable to import, once more, a number of selected varieties from the East, and to this end application was made to the Indian authorities for the best kinds from the various provinces, and cases of plants have been ordered from the Bombay-Bengal and Madras presidencies. It is almost certain that we do not possess all the types of the various strains of mango grown in the East, and although our number of seedling varieties is legion, yet it is probable that the introduction of further East Indian kinds will be of great advantage in the endeavour to improve the strains now cultivated in the Western world.

THE "MAUD" MANGO.—A fine bold dark green mango having a most delicious melting flesh, without fibre, and perfectly sweet. It is a seedling raised by the Hon'ble W. G. Gordon, and named in compliment to Mrs. Gordon. This mango must take its place among the best of our list.

DEUX-DOUX.—This is a pretty little mango, and as its name indicates, peculiarly sweet. It is one of those mangoes which the child needs no teaching to devour, as it only needs to follow on the lines on which it obtained its first nutriment to consume it to the greatest advantage. It is one of those mangoes to cut which spoils it. It has a soft melting pulp which will pass freely through a small hole made in the skin.

ST. JAMES' MANGO.—(Full size.) This is a seedling mango of peculiar form. It has a pronounced turpentine flavour, and a firm and rather fibrous sub-acid pulp, of a clean light yellow colour. The colour of the fruit when ripe is bright yellow. It could never be more than a second class mango at its best.

HONEY MANGO.—Dark green fruit, mottled yellow, with a slight purplish bloom. The flesh is soft and melting, very sweet, having a decided honey flavour. It has no trace of the turpentine taint so common among the mangoes.

THE "CAPTAIN" MANGO.—This is a mango yellowish green spotted with yellow. The fruit has a decided mamillated point on the apex. The flesh is firm, without fibre, but with a decided turpentine flavour, which is more than covered by its extreme sweetness. This tree, though a large one, fruited for the first time in 1899. Being so far unknown to us, it has been named the "Captain" to distinguish it from others.

THE "MARTIN'S" MANGO.—The Martin's mango was first seen in July, 1899, when samples were kindly sent on to the Gardens by the Hon'ble C. Leotaud. It is a pretty fruit with a fine purplish bloom on the cheek, but in the main the colour is green, dotted with the small yellow spots common to most mangoes. On first taste there may be detected a suspicion of the turpentine flavour, but this is rather agreeable than otherwise, and before the fruit is eaten is entirely forgotten in the sweet and luscious flavour which overcomes it in the mouth. The flesh is bright yellow, melting and rather meaty, with short fibre next the seed. The kind was received through the hands of French cultivators in Martinique.

DR. DE BOISSIERE'S MANGO.—The following description is taken from a manuscript left by my predecessor, Mr. H. Prestoe, dated 15th July, 1869:—"Flesh farinaceous-fibrous, but very tender – strong mango flavour, with only a dash of the turpentine taint; bright orange colour outside as well as inside, round, full and very succulent—a first-class mango—little liable to be attacked by rot or sourness."—*Trinidad Bulletin.*

THE ERADICATION OF LANTANA SCANDENS.

A good deal has already appeared on this subject in the pages of the *Indian Forester*. The question has, however, been re-opened recently by the Inspector-General of Forests, and the conclusions arrived at during the year may be of interest to our readers.

In May 1900 a suggestion was put forward by the Inspector-General to introduce into the country some well-chosen natural enemies of the Lantana in order to assist in its eradication.

"The *Lantana scandens* invasion of Coorg," wrote Mr. Ribbentrop, "has become a scourge to the country, and is spreading rapidly in other parts of Southern India.

"Originally, I have heard, introduced by the wife of a missionary as a hedge plant, it has taken rapid possession of open places in the forests, occupies grazing grounds, and threatens cultivation by spreading over every fallow area, even at a distance from the original stock, the seed being probably carried by birds.

"The eradication of the plant, when once it has taken possession of the ground, is an expensive business. It forms perfectly impenetrable thickets in which the sun does not reach the ground and nothing can grow. The *Lantana* takes sole possession. Once such thickets have formed, it is said in Coorg to be more costly to eradicate them than to clear virgin forests. The ryots, looking upon the invasion as an unconquerable pest, do nothing to help themselves and the evil is naturally spreading.

"In Berar the Forest Department took up the eradication of *Lantana* systematically and with considerable success. The Municipalities, and lately, I hear, the ryots, have followed suit.

"The first operations were naturally expensive, costing, however, but Rs. 4 per acre, against Rs. 30 estimated by the Commissioner of Coorg, where, however, it is to be said, the evil has taken a much longer and greater hold of the country. In Berar we have not succeeded in eradicating the plant; but at a cost of Rupees 30—50 per square mile, which is decreasing year by year, we keep it under sufficient subjugation to render it pactically harmless. A pre-considered plan for the work and a careful and steady adherence to it are, however, a *sine quanon*.

"Dr. Watt, when in Coorg, was consulted by the Commissioner, and he advised that enquiries should be made in South America (but Mexico I think it is), whence the plant originally came, what its enemies were in its own country and to import them, This plan was considered fantastic and was not acted up to and I think nothing else was done either. I am of opinion that a possibility of success underlies Dr. Watt's plan, and I would advise that in the first instance enquiries in this direction should be made from the Kew authorities, who are in touch with the botanists of the world.

"It may be possible, that somebody would have to be deputed to the original home of the *Lantana* to study the question locally, but even that would be but a small matter in comparison with the object in hand.

"That it is feasible however, to keep the *Lantana* within reasonable bounds, without introducing its enemies into this country, by unremitting attention towards its destruction, at a considerable cost it is true—but nothing compared with the estimate of the Commissioner of Coorg—has been proved in the Ellichpur district in Berar, where the plague assumed the most threatening appearance; and this might be pointed out to the Coorg authorities."

This view of the matter did not, however, recommend itself to Major Prain, the Director of the Botanical Survey of India, who wrote as follows :—

"I am not favourably impressed by the proposal to depute an officer to America to learn what the natural enemies of *Lantana* in its original habitat are. There are two well-known enemies of *Lantana*: both of them, as cures, are worse than the disease.

"One of its enemies is a Sunflower (*Tithonia*), which is becoming naturalized in many parts of India. It is found in Ceylon that where this runs wild it kills out and replaces *Lantana*. So different is the point of view that Ceylon planters look upon *Lantana* as a 'blessing' and think nothing has done so much as it has to renovate abandoned coffee land. The Sunflower they find, when re-clearing, to be more difficult to eradicate than *Lantana* is, and they believe that in place of renovating the soil the Sunflower greatly exhausts it.

"The other enemy is fortunately not yet very well known in India. This enemy is a scale-bug (*Orthezia insignis*) originally discovered at Kew, where it was causing damage in the plant houses It was noticed in Ceylon in 1893 or thereabouts, and was supposed to have been introduced from Kew, because it was first observed in the Royal Gardens at Peradeniya, to which place plants are often sent from Kew. But this is not clear to me, because the pest is also known, and gives trouble, in Natal. It was first noticed on *Lantana* in June 1898. By August 1898 it had spread, still on *Lantana*, with alarming rapidity, completely destroying, so it is asserted, the patches of *Lantana* it attacked.

"This *Orthezia* is one of the most destructive scale-bugs known. It by no means confines its attention to *Lantana*, but attacks, and is equally destructive to, many other species. When it is known that these include Tea; Coffee, both Arabian and Liberian; Cinchona; the Orange and all the other species of *Citrus*; Capsicums; and the Tomato, it will be seen that the alarm with which it suddens appearance on *Lantana* was viewed in Ceylon was a well-founded alarm, and it will be granted that the Government of Ceylon and the planting community there were justified in immediately taking the most drastic steps to stamp it out.

"Among the enemies of *Lantana* in its native country this or some similar pest may be numbered. It may well be that in its natural environment such a pest may cause no trouble. But remedies of this kind are apt to prove double-edged weapons, because there is no possibility of saying that in the new environment to which they are brought these will not get as completely out of hand as *Lantana* itself.

"As regards the methods detailed in the attached correspondence for dealing with the plant, I have little to say. I note that the cost of clearing land of *Lantana* in Berar is given at Rs. 15·8 per acre. This is interesting, because it agrees so well with the estimate given for Ceylon during a controversy that arose there so far back as 1881. It was found in Ceylon that land under *Lantana* for 12 years or more, and therefore as thickly covered with the shrub as it was possible to be, could be cleared by contract, the contractor cutting it down, uprooting every plant and burning the roots and stems, for Rs. 15 per acre. I find it stated that at present the plan used in Ceylon is to uproot the *Lantana* by bullock teams, and that the method is easy and effective. Its cost I have not seen noted.

"In Honolulu, where the experience has been exactly that of India and Ceylon, it is usually only the *small* plants that are uprooted. Large plants of *Lantana* have their stems cut across close to the ground and kerosine is then poured on the cut stumps. This is said effectively to prevent any further growth."

As to the steps taken at Chikalda in the Berars, mention of which is made in Major Prain's letter, Mr. Cecil Bagshawe, Conservator of Forests, gives an interesting account.

Lantana (scandens) clearance in the Station of Chikalda and the Melghat Taluq, Ellichpur District, Berar, 1894-95 *to* 1899-1900.

It seems well to describe the position of the Chikalda station and the Melghat hill, where the work was carried out.

1. Chikalda is on a plateau 3,600 feet above sea-level with more or less precipituous, dry and rocky slopes to the south, and on the north ravines with easy slopes and good, fairly moist soil, interspersed with steep and precipitous ground. On the north there are perennial streams; to the south torrent beds with waterfalls during the rainy season.

2. The Melghat Talnq * includes a southern extension of the Satpura range, is hilly throughout and varies in elevation from 600′ to 4,000′ above sea level.

The Tapti river and many of its tributaries rise in the Melghat and fall into the Indian Ocean, while the source of a main tributary of the Godavery is also within its limits, so that it forms a hilly well-watered part of the backbone of India.

The average rainfall is 78," which falls mainly from June to September; but the south-east and north-east monsoons sometimes give heavy showers in the autumn and winter.

3. *Lantana* was introduced into Chikalda about 1865, and was largely planted out for hedges. It flowers, fruits and the seeds germinate within a period of some five months and the plants grow freely from cuttings. *Lantana* was not recognised as a pest until about 1889, when it had overgrown the ravines, was spreading on the plateaux and even growing on the steep southern slopes.

In 1893, when the health of Chikalda and apparently any reproduction of valuable forest growth in the vicinity was endangered, the general eradication of *Lantana* was decided on.

4. To facilitate systematic working, the infested areas of the talnq were classed as—

(*a*) Very dense growth, including heavy hedges several miles in length and masses of *Lantana* matted into forest growth in the ravines where it sometimes climbed to the tops of trees 30—40 feet high.

(*b*) Dense growth scattered over extensive areas, but generally more accessible and easily destroyed than the (*a*) area in and near Chikalda.

(*c*) Scattered plots, dense in places, but easy of removal and in connection with which the chief expenditure was incurred in finding the plots.

The method adopted was to cut down † and thoroughly root up the plants, haul them to open spaces, and there destroy with fire. Rootlets left in the ground, it was found, did not shoot up, but plants and branches left lying on good soil readily took root.

This operation was called "clearing" and embraced the 1st year's work in each area dealt with.

In the 2nd year the areas were systematically gone over and all seedings etc., dug up, the operation being called the "1st cleaning." In the case of dense areas cleared, the following rains brought up a most complete crop of seedlings, which by August attained a height of 2—3 feet and flowered.

In the 3rd year seedlings were less plentiful, but the growth from 2nd year seedlings, broken off in the course of extraction in the 2nd year, gave much trouble and another systematic 2nd cleaning was made. In areas of very dense growth a 3rd cleaning was necessary.

Subsequent operations were called "scouring," to carry out which gangs of weeders in lines in open order were taken *rapidly* over the areas, once at the beginning and if possible, again at the close of the rains.

6. It is evident that the cost of the operations described cannot be correctly given by means of the average cost per acre for the whole aea, and it is therefore given by classes:—

	(*a*) Areas of very dense growth.			(*b*) Dense but more scattered growth.			(*c*) Scattered growth.		
	R.	a.	p.	R.	a.	p.	R.	a.	p.
CLEARING:									
Per acre ...	11	6	0	0	12	1	0	1	10
Per sqr. mile...	7,280	0	0	483	5	4	73	5	4
1ST CLEANING:									
Per acre ...	0	10	6	0	8	0	0	0	9
Per sqr. mile...	420	0	0	120	0	0	30	0	0
2ND CLEANING:									
Per acre ...	0	2	5	0	0	9	0	0	9
Per sqr. mile...	96	10	8	30	0	0	30	0	0
3RD CLEANING:									
Per acre ...	0	2	5	—			—		
Per sqr. mile ..	96	10	8	—			—		

The cost of scouring cannot be given per acre, but from 1900-01 about R1,000 a year is being spent in weeding over the whole taluq in areas formerly infested, and destroying any plots that have been previously overlooked. This charge will fall steadily from year to year, but the work must be continued for many years or until the destruction of *Lantana* at sight has become a custom.

The cost of clearing and cleaning operations may seem high, but it is difficult to vividly describe the labour of digging and removing dense masses of prickly *Lantana* from narrow ravines and wooded hillsidee.

7. Taking the whole Melghat (1,650 square miles) into account, R24,896 have been spent during the six years 1894-95 to 1899-1900. Acres 32,155·50= square miles, covered with *Lantana*, were cleared at a cost of R8,461 or R169 per square mile, while R16,435 were spent on cleaning and scouring. The average cost of cleaning is put at R54 per square mile, but the cost of the two operations cannot be given separately. It may be said that the eradication of Lantana has been most successfully carried out; the plant is rare in Chikalda, and has to be searched for in other parts of the taluq. Still watchful care is needed to prevent the scattered plants spreading.

8. When work was started in the Melghat, the extirpation of the plant throughout Berar was also aimed at, and a clearance started with fair success in all districts. It may, however, be said that the growth of Lantana is generally only luxuriant in Berar in hilly districts, 1,400 feet and upwaards in elevation, and in places with fair soil and moisture.

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* Area 1,650 square miles, and Chikalda, which is in the South-East of the taluq being about 77°30° E. and 25·30 ° N.

† Mechanical arrangements for hauling out with blocks and tackle were tried, and failed on score of expense.

PRUNING THE TOMATO.—When the fruit-bud appears we want to look out for suckers, which must be plucked off as fast as they appear. Keep in mind a straight, upright stalk, instead of the usual crawling vine we so often see. When the young fruit begins to form, put a stake about 4 feet long down on the opposite side of the fruit-bud, tie a cotton string around the tomato stalk immediately under the fruit-bud, leaving the cord loose, and then to stake, repeating this as the fruit-buds appear. This holds the plant firmly and causes it to grow straight and graceful, instead of falling all over the garden. Keep the suckers off by all means. When from four to eight fruit-buds appear, according to the fertility of the soil, top the plant, and you will have a magnificent crop of tomatoes, whereas if you let them go to vine you will have but very few. If they fail to ripen, a few leaves cut from the lower part of the stalk to admit the air will hasten it. Keep the suckers down, and the fruit will continue to ripen a long time if they have water and attention.—*Queensland Agricultural Journal.*

ANTIMALARIA CAMPAIGN.

The Roman correspondent of the *Lancet* has sent the following accouut of the systematic action of Italian physiologists in experimenting on the bites of mosquitoes at the cause of malaria

The strenuous efforts now being put forth in Italy to combat malaria and tuberculossis make it necessary to return frequently to these topics iu order to follow the progress of the campaign against them. In regard to malaria the *Academia dei Lincei* publishes the first report of the experiments nndertaken by Professor Grassi and others along the Battipaglia-Reggio line of railway from San Nicola Varco to Albanella, over a distance of some eight miles. The objects aimed at were two: (1) to prove that malaria can be contracted only through the hites of anopheles; and (2) to find means of overcoming the practical difficulties that stand in the way of an efficient prophylaxis. Altogether 104 persons, including 38 children under 10 years of age, were kept under observation, all of them being railway employes with their respective families, living at the two stations and in various honses, 10 in number, along the line. The locality chosen, the Plain of Capaccio, is among the most unhealthy in all Italy. The persons selected for the experiment had all been examined during the non-malarial season—that is to say, before the anopheles had become infected—and those found to be malarious had been treated with quinine. The preventive measures adopted were the protection of the houses from the entrance of mosquitoes by wire gauze over the windows and the wearing by any persons obliged to he on duty outside after sunset or during the night of a simple veil attached round the hat with elastic, and of thick cottou gloves with tight sleeves. All who could went indoors at sunset and did not come out again till after sunrise. It was found very difficult, especially at first, to induce the people to observe these simple precautions in the efficacy of which they had no faith, but, nevertheless, of the 104 individuals experimented upon, excepting three cases of relapses which had escaped the previous treatment by quinine, not one has so far been attacked by malaria. This is very fortunate, for in spite of all precautions some anopheles succeeded in inflicting their hites, aud although the proportion of infected insects is small (1 per cent.) one of these latter might easily have found its way into a house and inoculated some of the inmates. The better to supervise the experiment Professor Grassi speut three days a week on his field of operations, sleeping at the station of Albanella with open windows (covered, of course, with the wire gauze), and the same was done, though for shorter periods by Dr. Martirauo aud Dr. Blessich who assisted him. While the subjects of the experiment thus enjoyed a complete immunity from malarial fever the other inhabitants of the same locality, who may be regarded as so many control subjects, not having been protected iu any way against the anopheles, fared very differently, having, it is stated, been all attacked, even those living under otherwise superior conditions. Other similar experiments have been carried out by Di Mattei in the Val Savoja* and by Dr. Fermi and Dr. Tonsini on the Island of Asinara,† near Sardinia. The former place is exceedingly malarious, and the mosquitoes are numerous; nevertheless, by the aid of wire gauze over the windows of the house, and the use of oil of turpentine on the hands and faces of the five inmates who carried out the experiment, the mosquitoes were kept away, and no case of malaria occurred during a period of four months. Elsewhere in the locality malaria was raging. In Asinara the conditions are peculiarly favourable for testing the practicability of entirely ridding a given area of malaria by destroying the mosquitoes infesting it, Dr. Fermi and Dr. Tonsini, hy destroying the larvæ with petroleum, and the adult mosquitoes by means of pyrethrum, chrysanthemum, valerian, and zanzolina, succeeded in exterminating anopheles in the island, and greatly diminishing the number of culex pipiens. At the same time use was made of wire gauze over the windows of the houses to protect the inhabitants from being hitten, with the result that no fresh case of malaria occurred in the island, althovgh in the previous year 40 persons had contracted the disease there. The experiment was carried out last year from June to November, and is being oontinued this scason.

* Annali d'Igiene Sper., fast. 2, 1900.
† *Ibid.*

The last number of *Nature* also contains a notice of the work of Dr. L. Sambon and Dr. G. C. Low, of the London School of Tropical Medicine, in a part of the Roman Campagna, near Ostia, where scarcely a person spends a night without contracting a malarial fever of a virnlent type. No quinine or other drug was to be taken as a precautionary measure, but the investigators were to live in a mosquito-proof hut from an hour before sunset to an honr after sunrise, so as to avoid being bitten by mosquitoes, which only feed during the night. The experiment was planned to test the reality of the connection between malaria and mosquitoes, and the *British Medical Journal* reports that it has heeu most successful. On September 13, Prof. Grassi visited the residence of the investigators with several other men of science, and gave his testimony as to the value of the experiment in the following telegram to Dr. Manson:—"Assemhled in British mosquito-proof hut, having verified perfect health experimenters amongst malarial stricken inhabitants, I salute Manson who first formulated mosquito malarial theory.—Grassi." So far as the experiment has gone, therefore, the result is entirely satisfactory, and affords the strongest support to the mosquito theory of malaria. Additional evidence is given by Dr. Elliott, a member of the Liverpool expedition sent to Nigeria some time ago to investigate the subject of malaria fever, who has recently returned to this country. He reports that the members of the expedition have been perfectly well, although they have spent fonr months in some of the most malarious spots. They lived practically amongst marshes and other places hitherto supposed to be the most deadly, and they attribute their immunity to the careful use of mosquito nets at night.

Another experiment arranged in connection with the malarial investigation in the Campagna is described in the *British Medical Journal*. Drs. Sambon and Low have shown that hy avoiding mosquitoes they avoid malaria; but this is, after all, only negative evidence, aud its full value can only be appreciated in connection with the actual production of malaria in a healthy person in this country by the bites of mosquitoes containing the germs of the disease. The evidence is now forthcoming. A consignment of mosquitoes which had been fed on the blood of a sufferer from malaria in Rome, under the direction of Prof. Bastianelli, was received in London early in July. A son of Dr. Manson, who offered himself as a subject for experiment, allowed himself to he hitten hy these insects, and, though he has never heen in a malarious country since he was a child, he is now suffering from well-marked malarial infection of douhle tertian type, and microscopical examination shows the presence of numerous parasites in his blood. Full details of the experiments will be published in due course; meanwhile, they must he regarded as affording the most striking confirmation of malaria by mosquito bites that has yet been obtained.

The number of the *Lancet* for September 29th also contains a paper by Dr. Patrick Manson on "Experimental Proof of the Mosquito Malaria Theory."—*Journal of the Society of Arts.*

THE CHEAPEST FORM OF NITROGEN.

One of the best authorities on the value and action of sulphate of ammonia and nitrate of soda on certain crops, Professor Warrington, writes to the quarterly *Journal* of the Royal Agricultural Society, England, as follows :—

NITRATE BEST FOR LIMEY SOIL.

On land containing no carbonate of calcium (or, in other words, lime), sulphate of ammonium cannot be profitably used as a manure, though nitrate of soda may.

2. On land containing a large amount of carbonate of calcium (lime) sulphate of ammonium will seldom give its best result if applied as a top-dressing. On such land the proper course is to cover the manure with soil by the plough, and harrow it immediately after being distributed over the surface.

3. Though sulphate of ammonium may often be successfully used as a top-dressing upon ordinary land, it gives its best return when it is ploughed or harrowed in before sowing the seed. It is thus specially suitable for application to spring corn and potatoes.

4. Ammonium salts do not become available as plant food till they have become converted into nitrate of calcium. This nitrification will not take place in a dry soil, but in most arable soils it will speedily occur in showery weather.

5. Nitrate of sodium, being immediately available as plant food, and distributing itself in the soil more rapidly than the nitrate of calcium arising from the nitrification of sulphate of ammonium, this manure is generally more suitable for use as top-dressings to growing crops and for late applications.

SULPHATE HAS MORE GRADUL EFFECT.

6. The effect of sulphate of ammonium is always more gradual than that of nitrate of sodium, and is especially prolonged in soils containing little lime, and in old grass land, or when associated with organic manures. This implies a more gradual or a longer continuance of growth in the crop receiving it, and results in some cases in a better quality of produce.

7. The character of the climate or season frequently determines whether nitrate of sodium or sulphate of ammonium will be the more profitable manure. In a dry season nitrate of sodium always gives a better return for the same quantity of nitrogen applied, while in a wet summer the advantage is frequently with the ammonium salt. This influence of climate is most clearly seen in the case of cereal crops, or on grass land; it is less perceived in the case of crops, like potatoes and mangels, which have a long period of growth.

8. The greater crop frequently given by nitrate of sodium is in part due to the soda which it supplies, the soda acting beneficially both in the soil and in the plant.

PRODUCE YIELDED.

9. The produce yielded by sulphate of ammonium is more dependent on the presence in the soil of an abundant supply of cinereal plant food than is the case when nitrate of sodium is employed. Kainit is an excellent addition to sulphate of ammonium.

10. On an average of ten series of field experiments with cereal crops, continued throughout many years, in which equal quantities of nitrogen in the forms of nitrate of sodium and ammonium salts were applied to soils well supplied with potash, soda, and phosphates, the average return in corn was 93 by ammonium salts for 100 by nitrate of sodium, and in straw 79 by ammonia for 100 by nitrate. The return in corn is thus not very different by two manures, but the return in straw is considerably larger when nitrate of sodium is used. The quality of the corn was a little better where ammonium salts had been employed.

SOME FIELD EXPERIMENTS.

11. In three series of field experiments on grass hay, conducted in the manner thus described, the average return by ammonium salts was 85 per cent. of that given by nitrate of sodium, when the first cutting of hay was alone considered. When the second cutting of hay was included, the return by ammonium salts was in two series of experiments 88 per cent. of that given by the nitrate.

12. In the first ten years of the Rothamsted experiments with potatoes, the produce by ammonium salts was on an average fully equal to that yielded by nitrate of sodium. No dung was used, but alkali salts and superphosphate were applied.

13. The weight of mangel roots yielded by ammonium salts during seventeen years at Rothamsted was on an average only 76 per cent. of that yielded by nitrate of sodium, but when the superior quality of the roots grown by ammonium salts is taken into account, the return by the ammonia is probably 82 per cent. of that given by the nitrate. No dung was used, but alkaki salts and superphosphate were applied.

FARM EXPERIMENTS IN SCOTLAND.

14. The farm experiments made on turnips in Scotland and the north of England, with small quantites of sulphate of ammonium and nitrate of sodium generally do not show any considerable difference in the effect of these two manures.

15. Sulphate of ammonium of average quality will contain 24½ per cent. of ammonia. Nitrate of sodium of 95 per cent. purity will contain nitrogen equivalent to 19 per cent. of ammonia; 19 lb. of sulphate of ammonium will thus supply as much nitrogen as 24½ lb. of nitrate of sodium.

16. If the nitrogen in the two manures produced the same effect on crops, their money value would be determined simply by their contents in nitrogen. Thus when nitrate of sodium was £8 a ton, sulphate of ammonium would be worth £10 6s. Under various circumstances already described, the nitrogen in sulphate of ammonium is sometimes as effective as that in nitrate of sodium, and sometimes gives a smaller return. —*Queensland Agricultural Journal.*

"FOXY COFFEE."

To Editor "Planting Opinion."

Sir,—With reference to Mr. P. G. Tipping's query *re* "Foxy Coffee" in your impression of the 5th instant, I think he will find the following information of some use. Speaking on the subject at the U. P. A. S. I. Meeting in 1899, Mr. Graham Anderson, C.I.E., said :—"This term ("foxy") denotes a reddy-brown appearance of the seed caused by the adhesion of the silver skin into which the colouring matter contained

in the outer skin and fruity portion of the cherry has infiltrated. *This appearance is undoubted evidence of the fruit having been picked when quite ripe* (italics mine); and nearly all really good, cherry-dried coffee, which is so highly esteemed in France, is thus indelibly marked. The quality of the coffee is in no way injured, the stain being superficial and confined to the silver skin, which can easily be scraped off with a penknife. If roasted carefully, the aroma will be found excellent, which is another proof of maturity. If a quantity of ripe coffee fruit is heaped, or kept in a cistern, fermentation will take place, and the red colouring of the skin and fruity portions will sink into the gummy substance surrounding the "parchment," precisely in the same way that aniline ink penetrates the gelatine slab used for copying letters. If prompt measures are not adopted, not only will the parchment be permanently discoloured, but the silver skin below will be stained and firmly gummed on to the seed. If observed in time, the remedy consists of getting the fruit pulped as soon as possible; in closely watching the subsequent fermentation, and having the parchment thoroughly washed as soon as the gum has changed into a state in which it can be acted upon by water. In warm, rainy weather similar changes occur in very ripe cherry before it is picked from the trees. Some pulpers do not work satisfactorily and allow a large quantity of skins and half-pulped cherry to pass into the cistern along with the parchment. If these are not properly separated, before fermentation takes place the seeds they contain will be more or less foxy. The ripest richest and most succulent fruit is always the first to suffer in this way, or from any delay occurring in "picking, pulping or preparation."

Last season, in his desire to enhance the quality of his coffee, a proprietor hereabouts allowed his coffee to get dead, or purple, ripe on the trees before picking it, and to his thundering surprise, it was reported on from the Coast as foxy. Now his coffee had never before been reported on as foxy. His surprise was even greater when he was told that the "foxiness" had probably been produced by his allowing the fruit to become over-ripe on the trees before gathering it. On the other hand, on a neighbouring estate, the coffee, which had previously to *last* season been nearly always pronounced foxy, was that season singularly free of "foxiness." This was attributed to a uniformity of shade over the place which seems to have been attained for the first time in 1898-99; but the "trick" seems to have been done by washing the coffee twelve hours after pulping it, the pulp house having a position facing south-west, and the aspect of the estate being throughout nearly the same.

The obvious precautions which suggest themselves from the foregoing are—

(1) To avoid, as far as possible, allowing the berries to become dead, or purple, ripe on the trees. They should be picked as uniformly red-ripe as possible. A spot of green on the outside pulp will make no difference, the bean being nearly always matured before the pericarp has been fully coloured.

(2) To pulp the coffee as soon after taking in as possible. The operations of pulping and measuring might go on simultaneously. Some power more expeditious than cattle-power is desirable in this connection.

(3) To pulp as cleanly as possible. If pulpers are not working satisfactorily, this must be done with the aid of a sieve, the skins and half-pulped cherry being passed through the pulpers a second time.

(4) To wash the coffee as soon as the mucilage is ready to be acted on by water. This can be determined by experiment. For the rest, trust in Providence. I trust that this small contribution on the question will promote a healthy discussion which will lead to the elucidation of a subject which there is no gainsaying is of great importance to the planting industry.—H. G. R.

COFFEE SUBSTITUTE.

Read the following letter from Dr. G. Watt, Reporter on Economic Products to the Government of India, dated Calcutta, 14th June, 1900, in answer to our query about the value and analysis of Spermacoce hispida seeds sent:—"I have the honour to acknowledge the receipt of your letter No. 809, dated the 25th May, 1900. In reply I beg to say the question was referred to Mr. D. Hooper, F.I.C., F.C.S., who reports "that the seeds of *Spermacoce hispida* have the same shape as coffee berries, but are brown in colour and much smaller, ¼x1·12 inch: The seeds were powdered and analysed with the following results:—They contained a thick greenish oil dissolved by ether; a quantity of astringent matter giving a greenish colour with iron saltf; a bitter principle soluble in alcohol having the re-actions of an alkaloid; a colouring matter giving an orange solution with alkalis; mucilaginous and albuminous matter soluble in water. The moisture of the seeds amounted to 10·75 per cent. and the ash 6·7 per cent. These seeds contain similar constituents to Coffee and afford a substance of similar odour when roasted over a fire. They appear to have nourishing and stimulating properties different to other seeds offered as substitutes for Coffee. Their commercial use depends upon the abundance of the plant and the labour of collecting the seeds."—*Madras Agri-Horticultural Society.*

BANANA DISEASE.

The disease, which has been so prominent a feature among the banana family in Trinidad, appeared at the St. Clair Station experiment during of the first year of cultivation, and many plants were killed out by it. This disease is caused by a species of fungi known as *Marasmus semiustus*, which attacks the older leaves eventually causing the whole stem and fruit to decay. From the fact of some plants growing in soil which was of a rich character not succumbing to the disease and developing their fruit in perfection it was inferred that the growth and spread of this disease was in a great measure due to the want of proper manurial constituents in the soil, in which they were growing.

To test this view of the case, a parcel of land was especially prepared by heavy manuring, and suckers from diseased roots were planted therein. The result has been a growth as good as could be wished, and although the fungus can be seen to be present, it is not able to fight against and overcome the "vegetative vigour" of the plants

under these conditions. These results seem to point to the supposition that the fungus is itself really only a saprophyte, (*i.e.*,) living usually upon dead material, but at the same time one able, under conditions of impoverished growth, to attack and destroy living vegetable growths which have been weakened by starvation or other causes, as is probably the case with the cane fungus *Trichosphæria Sachari* in abnormal seasons, and in unsuitable or impoverished lands or where the constitution of the growing plants have been weakened by other causes.—*Trinidad Bulletin.*

CHILE PEPPER CULTURE.

Mr. J. B. Neff, of Anaheim, California, discourses on chile pepper culture in the *Californian Cultivator*, on the basis of his own experience as a successful producer of hot stuff:—

How Plants are Grown.—A hot bed is made by excavating about 16 inches deep; fill in to within 4 inches of the top with damp stable manure, trampling down vrey solidly. Spread about 4 inches of sandy loam over the manure. The seed is sown quite thickly over the loam, and then about ½-inch of loose sandy soil placed evenly over it, and all kept damp. When the plants have two or three leaves, thin to 1½ inches apart each way. The plants must be watered while in the hot-bed by sprinkling. Great care should be taken to protect from frost.

Soil and Preparation.—Rich sandy soil is the best for the chile pepper. It should be ploughed deeply, and be put in a state of thorough cultivation. Ridges should be made 3 feet apart, and the plants set 2½ feet apart on the ridges. All plants must be on a water line, and to get this the ridges should be made, water run down the furrows, and the plants placed about 2 inches above the water-mark. This insures every plant receiving water when irrigated. Plant as soon as danger from frost is past.

Cultivation.—Frequent cultivation is necessary until the plants get too large to allow of a cultivator and horse passing between the rows. All weeds must be pulled out. When the plants are set as before noted, all the ridges will be on one side. This must be worked down with a cultivator, and then a plough used to throw earth on either side of the furrow, so that the plants will be midway on the ridge.

Irrigation.—While the plants are small water will be needed about once in twenty days, but as they get larger it will be needed as often as once a week, though only in small quantities. The plants seems to have no deep roots, consequently the surface soil must be kept damp.

Picking.—The field should be gone over about once a week after the peppers begin to ripen, all that are fully ripe being taken off. Great care must be exercised to pick all the stem with the pepper. They should be allowed to lie in the sun one day after being picked in order to toughen the stems and prevent them breaking during the process of curing.

Stringing.—The common method is to cut strings of strong smooth twine 8½ feet long. Draw this through a needle about 12 inches long, which is often made of a bicycle spoke. Peppers having any breaks or blemishes must be thrown away, as they would decay before drying properly. Of course, where an evaporator is used these can be saved. After the strings are full and tied they are hung on nails driven into a rough pole or other framework standing about 6 feet from the ground, and left until dry; or if shelter is available they may be moved before becoming fully dry and hung closely together until such shelter, but where there is a free circulation of air.

Evaporating.—Many growers prefer evaporating instead of drying. The evaporators used are of various designs and sizes, but they should be large enough when the peppers are dried on strings to hold not less than 500 strings. The usual plan is to have a furnace with several turns of 8 to 10 inch pipe in the basement, the peppers being placed in the second storey over a very open floor and with good ventilation. The temperature must be kept at 110 degrees Fahr., and in this way the house can be refilled about every four days.

Yield and price.—Both of these, of course, vary with the season, soil, and water supply. Two hundred and fifty strings of 5 lb. each is called a paying crop, but with all conditions favourable, including a late, warm season, as high as 400 strings, or even 2,400 lb. per acre, of dried peppers may be grown. Prices range from 35 to 75 cents. per string if sun-dried, and 7½ to 12½ cents. per lb. if evaporated.—*Queensland Agricultural Journal.*

A NEW VEGETABLE.

A new vegetable, and one that promises to be a great acquisition, says the *Australasian*, is the asparagus pea, introduced into Victoria by Lord Hopetoun. It is extremely prolific, and most people would pronounce it a delicious vegetable when properly prepared, combining, as it does, the pronounced flavour of asparagus with the delicate suggestion of the table pea. The method of culture is that of the ordinary pea, and the particulars as to price of seed, &c., can be obtained from Messrs. Adamson and Son. Amongst other places where it can be seen in full profusion is the Leongatha Labour Colony, and the head gardener there states that it is suited to all classes of climate, thriving almost equally well with or without watering. The plant is of a prostrate nature, branching much like a rock melon, and spreading nearly two feet. Stem prostrate, leaves trifoliates leaflets spatulate ovate, an inch in length, two stipules ovate, flower axillary, and of a scarlet red and purple, giving the appearance of a field of red clover. Pod square, with fringe on each side, 2in. to 4in, long, containing six to ten small peas. The pod is cooked and eaten with the fingers, after the manner of asparagus. With reference to the above, Mr. Wicken of the Department of Agriculture, to whom the matter was referred, said:—"I have grown this for several years. When I came over here last March I brought a small quantity of this seed and sent some to Subiaco for trial, and some to Drakesbrook. They both came up, but that at Subiaco has not done very well, while that at Drakesbrook was not sufficiently forward to report on at my last visit."

THE PLANTING OF MANGO GROVES.

The following brief account of the method employed in Thana, Bombay Presidency, for the planting up of open spaces with mango grafts, may interest some of your readers, who have not had experience in such planting.

Pits 4' x 4' are dug and left open for three or four days. Grass and dead leaves are then placed in the pits and burnt so as to destroy the roots of any other trees that may happen to be there.

Fresh earth from the margin and bed of dried-up tanks, and from cultivated rice fields is brought and the pits are then filled up, each with an alternate layer of tank-earth and field-earth. The sites of the pits are well watered daily for about 8 or 9 days.

The mango grafts are brought growing in earthenware pots. Holes 1 to 1½ feet deep are prepared in the sites of the old pits and in them the grafts are inserted. But before insertion a little fresh earth from the spoil bank above is thrown into the holes to render them shallower and a layer of cowdung ashes is spread over this. It is needless, perhaps, to remark that the earthenware pots in which the grafts exist are broken and that the resulting ball of earth surrounding the roots is inserted in the holes.

More earth is then thrown into the holes and carefully arranged with the hands around the ball ot earth surrounding the roots. Then a second layer of cowdung ashes is applied, and over this another layer of earth. When the holes are completely filled, a third layer of cowdung ashes is placed at the surface surrounding the stem, and the ground is well watered.

The graft is now established and the grafted portion of the plant is on a level with the surface soil. In order to induce the plant to grow erect, a bamboo support is tied to it.

One month or 1½ months after planting the stock is pruned near the summit, and six or eight months after it is cut off almost down to the point of the graft.

The three layers of cowdung ashes are applied to prevent the roots being attacked by white-ants, etc.

Mr. Jagannath Damajee, an expert in planting mango grafts, for he has established over 2,000 plants successfully in Thana informs me that when the plants are 3 to 5 years old, a layer of salt, about an inch or two deep, should be placed round the stem, commencing at a radius of about 1½ feet from it—to further protect the plants from insects' attacks.

He forms mounds of earth round the stems during the rains at this age of the plants and removes them (the mounds) in the hot weather.—G. M. R.—*Indian Forester.*

PLANTING NOTES.

ANIMAL MANURE.—From a series of careful experiments which have been made from time to time, it has been shown that a well-fed horse produces from 5 to 6 tons of manure per annum during the time he is in the stable. A steer of 1,000 lb. produces about 20 tons of manure a year. A sheep weighing 6 lb. would produce about three fourths of a ton, and a pig from 2 to 3 tons of manure yearly. These amounts include the necessary bedding to keep the animals comfortable—*Queensland Agricultural Journal.*

INDIA-RUBBER IN SIERRA LEONE.—The United States Council at Sierra Leone reports favourably on the local india-rubber industry. He states, however, that the native collectors are now frequently bleeding the roots of the tree as well as the body—a proceeding which is as fatal to the tree as to the quality of the rubber. —*Queensland Agricultural Journal.*

KEEP THEM BUSY.—Hens that go in the corner and sit down should be put to work. In the morning give them about one-third as much food as they can eat, so as to have them hungry. Then get some leaves, cut straw or dirt, and scatter about a tea-spoonful of wheat, corn, and oats (mixed) through it. The hens will soon get hungry, and finding one grain will hunt for another. That is just what you want. Give them nothing until night, then feed all they want. Do this every day. Keep them hungry during the day, but feed them well before going to roost, and they will keep well and lay.—*Farm and Fireside.*

FRENCH SCENT FARMS.—The flowers mostly cultivated on the French scent farms are the violet, the jonquil, and mignonette, which are picked in February, March and April, though when the winter is mild and rainy, violets begin to flower in December. Roses, orange blossom, thyme and rosemary are gathered in May and June, tuberose and jasmine in July and August, lavender in September, and acacia in October and November. But the most important crops of flowers are the roses and orange blossoms, the others being mostly grown by small cultivators in the rural districts among their vines and olives. One of the largest flower farms is one at Seillans, about 2,000 feet above the level of the sea, and 20 miles from the coast, until the southern slope of the Alpes-Maritimes.—*Australian Field.*

A RUBBER PLANT FOR TEMPERATE CLIMES.—In a recent lecture at the Paris Academie des Science (says *Das Handetsmuseum*), Messrs. I Dybowski and G. Frou introduced a new rubber furnishing plant, a native of Northern China, which is at present cultivated with great success at the Jardin des Plantes, the Paris Horticultural Gardens. Up to the present time rubber has been extracted from trees only, and efforts have been made to acclimatise those from the Netherland East Indies in the French colonies, but unfortunately, without any result whatever. This new plant, called *Encomia illinoides*, whose fruits contain over 27 per cent. of indiarubber, has great economical advantage. It can easily be acclimatised and cultivated in countries of even a moderate climate.—*Queensland Agricultural Journal.*

GERMINATING OLIVE SEEDS.—The olive tree is, as a rule, propagated by means of truncheons, or cuttings, or from the tips of the branches, but it may also be grown from the seed, the latter being first cracked and well washed. Experiments have lately been made in Italy to determine the effect of different temperatures of water on the germination of the seeds. After removing the pericarp from a number of olives the seeds of eight lots were subjected for ten minutes to the action of water of different temperatures, the initial temperature of which varied from 30 to 100 degrees C. The seeds were then planted, and the germinations for seven months were tabulated. It appears that the germination of the olive seeds was accelerated when they were treated with water heated to from 40 to 50 degrees, and the maximum was reached at 70 degrees C. When the water was hotter than 90 degrees C. there was no germination, the seed having been killed.—*Queensland Agricultural Journal.*

DISTRIBUTION OF OUR COCONUT PRODUCTS.

The Distribution Table compiled by the Chamber of Commerce, showing the destination of our Exports, is of continuous interest to the statistician and the businessman. The figures for last year bearing on the products of the Coconut palm, are, like those of previous years on which we have commented, as puzzling in some respects as they are interesting. There is one circumstance which must strike the observer—the wide distribution of these products, going, as one or other of them does, (several in some cases) direct to 18 out of 19 countries whose names appear on the Export list. And the fact that these countries take up practically all that we produce every year, and that the result has been attained without any special efforts, such as have been found necessary in the case of Tea, is evidence that the supply is not outstripping the demand, and that the Palm holds what may be called a steady market. Our remark applies, not only to the older products, such as Oil and Poonac, in which business has been done with the outside world for generations, but also to more recent exports like Copra and Coconuts in the shell, and to the entirely new industry of Desiccated Coconut which already finds its way direct to twelve countries, most of which are, probably, centres of distribution. The time that the palm takes to bear, has, doubtless, been its chief safeguard against the rush which quick returns provoke in the case of both Tea and Coffee, both of which of late, have had to contend with the problem of over-production, and the inability of the markets of the world to take up all that was being hurried into them.

But to deal with distribution, the United Kingdom was our largest customer for Oil—having taken 257,655 cwt., or nearly three-fifths of the output of last year. In the previous year it took only one-half, though then too, it was the largest buyer, America coming next with more than one fourth to its credit. But last year America took little more than one-half of the previous year's purchases, or one-seventh of the total exports, and was distanced by India, which claimed 88,148 cwt. In 1898, however, India stood at the top of the list, having taken 125,687 cwt., against 123,316 cwt. by the mother country; while Singapore which has dropped off to 6,052 cwt. in the latest returns, stood third with 91,893 cwt.! What is the explanation of these violent oscillations? The demands of the United Kingdom and America where the Oil is chiefly used for soap-making and candles, are believed to be regulated by the abundance or scarcity of animal fat and the imports of African palm oil; but in India and the Far East the Oil is largely wanted for food and lighting; and it is a puzzle how they can do with so little one year, when so much can be taken off another year. Nor do we find, on the assumption that the Oil taken by Singapore is intended for the American market, any correspondence in the exports to the two countries.

In Copra, Russia stands *facile princeps*, having taken 99,620 cwt. out of 362,467 cwt., Belgium coming next with 77,988 cwt. and Germany third with 65,599 cwt. In 1899, too, she stood (more easily) first with nearly 105,000 cwt., against 76,634 cwt. for Belgium; while in 1898, the year of our largest export, Russia had no less than 143,688 cwt. to her credit, out of 506,000 cwt. The mother country continues our best customer for Desiccated Coconut, having taken nearly nine million lb. out of 13½ million lb. exported; but in 1899 she had nearly 9½ million lb. out of a smaller output. America is the next best with 1,829,280 lb., followed by Germany with 1,149,471 lb. The other countries which take large quantities are Australia, Belgium, Austria, France, Holland, Africa and China; so that, if only quality keeps up, there is no reason why there should not be that steady growth of the trade which we anticipate. Our Poonac is not sought by many countries; but with Germany taking a little more than a half, and Belgium somewhat less than a half of the output, there is not much left for other countries. The mother country stands first again for Coconuts in the shell, having taken over ten million nuts out of less than 15 million sent away. Africa comes second with over 2½ million, and India third with over a million; and almost all the continental nations are among our customers for nuts. Ceylon Coir, in its various forms of Rope, Yarn and Fibre, find their way to almost all the countries on the list—Singapore taking all but 1,000 cwt. of Rope, and the United Kingdom almost seven-eighths of the yarn, and more than one-half of the fibres.

"RESTING" TEA AND MINOR PRODUCTS.

A correspondent writes;—

"An idea has just occurred to me that, perhaps, the Hakgalla or Peradeniya people might be able to suggest a Product that we could grow between the lines of our tea, while the fields are *resting*: anything that would pay for the weeding of these fields would be a help; pine apples grow well where the climate is hot and forcing, and pine fibre *might* be of use if machines could be introduced at little cost for its preparation?"

A good authority replies on the above;—

"I am afraid I cannot recommend anything to grow among tea that is likely to pay, as I think the tea plants require all the ground allotted to them. The roots of the tea would not allow anything else to have a chance. Where the tea is widely planted and in good soil, the 'ground nut,' pine-apples and tomatoes may struggle along; but I don't think they would pay, as the tea bushes would soon smother them. I understand the resting of the tea to mean that it should be allowed to run for three years and then to be pruned down and start afresh in general cultivation. In this case if the ground is in fair heart the tea would grow so quickly that few weeds would grow and very little weeding would be required."

THE ENDURANCE OF TROPICAL HEAT.

Dr. William Hunter Workman, M.A., M.D, F.R.G.S, writes an article of nearly six columns in length in the *Pioneer* this month entitled: "The Endurance of Tropical Heat, a Study from Personal Experience," and endeavours to combat, and claims to destroy, some of the prevailing notions regarding heat in the tropics. Dr. Workman is known in Ceylon for his five months' tour here with Mrs. Workman, whose fame, by the way, springs rather from her being the first lady mountaineer in the world than from any cycling achievements. He certainly achieved longer rides *per diem* in our hill and lowcountry than are usually performed by the ordinary resident in this island; but his experiences in India, not in endurance of mere heat alone, but of thirst, becoming continuously more intolerable, which is the outcome of long distance wheeling in the peculiar heat prevailing on the driest routes traversed, certainly surpassed anything undergone in the way of physical hardship in our midst. Here we may quote an interesting passage:—

"We carried four felt-covered aluminium water-canteens, each containing a quart. If the contents of these had been used with any such freedom as thirst demanded, our supply would never have lasted beyond noon, and usually not till then. We found it advisable when passing a railway station at any time during the day to stop to fill our canteens, and drink as much water as we possibly could. Otherwise we replenished our stock as occasion offered at dak bungalows, or failing these, if we passed through a town large enough to have a postmaster, we applied to him, though we drank with misgivings unboiled water obtained from natives. In riding through the Bhil country and other famine districts in February, 1900, we had no opportunity to obtain any water except at an occasional railway station. Nearly all wells, streams and tanks were dry. When all the above sources failed, we had to endure the tortures of thirst, from the time our canteens gave out till the journey's end. On one such occasion when our last drop of water was exhausted at three o'clock p.m. we arrived at our destination in darkness at half-past seven so used up and with throats so parched that we could only with difficulty utter an articulate sound."

Survivors of such hardships, we would point out, must be persons extremely well-fitted physically for the trials of endurance undergone; and we do not hold this to be any proof of what may be done by the residents of longstanding in the country, who bear the heat and burden of the day, working in their offices, and are only able to take comparatively brief exercise before our briefer tropic twilight. The advice Mr. Workman so vividly describes, as warnings to him that he must not do this and that, was, of course, given by people who have become more subject to the effect of the tropical sun; and, even if well meant, has, we admit, proved more than mistaken in the case of this successful tourist over islands and continents of no mean size. What we would emphasize is that Mr. Workman had experienced a good deal of foreign travel, involving physical endurance, before his arduous wanderings in India, and that he was therefore in a condition to stand far more than the Anglo-Indian, however abstemious, who becomes slightly more subject to the effects of tropical *heat*—not necessarily of the sun's rays, for though Mr. Workman half hints that exposure to these in India *need* not do harm, he does not exactly say so—with each succeeding year. Mr. Workman "dodges" this question of sun's rays with the ability of a mountaineer on the prose slopes that correspond to those of Parnassus! In Kashmir he has stepped into the open sunlight with only a cap on his head, *but*—at 5,000 feet above sea; in America, at close on 100 degrees Fahr., he has seen young men expose themselves for hours to the burning sun and done the same himself; but no mention is made of similar exposure in the plains. Even if such was undergone, his subsequent mountaineering feats prove that he and his active wife were persons of no common powers in the endurance of extreme heat and extreme cold, in the art of pedalling an extensive mileage and of making stiff pedestrian ascents.

"Moidart," in the *Pioneer*, writes a witty and useful letter in reply to Dr. Workman, but the record of his far more dependable experience is spoiled by attributing exaggerated conclusions to Dr. Workman's long and, throughout, able article. Nevertheless we give two extracts, the first for its practical worth, the second for the entertaining advice given; and with these we conclude:—

"As to what to do to stand the heat, I say only general rules can be given which each man must adjust to suit his own constitution. Watch your health. Wear what clothes you can. Prickly heat will soon explain if you make a mistake. Wear a hat of thickness which will allow you to stay out from 10 to 3 without a headache, and see that it is well ventilated above the hair. Don't go out, unless obliged, before the sun is up; as nothing gives a headache more quickly than horizontal sunrays which strike your neck below your hat. Take as much exercise as your organisation will permit, as you must never allow yourself to be overtired. It upsets digestion and banishes sleep. Sleep as long as you can. Goodness knows it is little you get at some seasons of the year.

"I presume we shall soon hear of Dr. Workman lecturing in Europe on the failure, through their own bad management, of Europeans in India to enjoy the glorious climate they are privileged to live in: also advice as to how they should bear heat and, I must not forget, quench thirst, this time, I hope, in a temperature above 130 degrees. On the chance of this meeting his eye, I would humbly and with due deference suggest that, to assuage abnormal thirst after a hot day, a more effectual and perhaps more *comfortable* remedy, than pouring gallons of fluid down his throat, would be to soak himself in a warm bath and then sip a cup of boiling tea or, still better, one cold, weak, however pernicious and despised whisky and soda."

THE SISAL MATTER.

(*To the Editor of "the Speaker."*)

Sir—I should like to make a few remarks in reference to a letter signed "Observer" in your issue of the 15th inst. In the first place, your correspondent has misread the report of the Co-

lonial Secretary of the Bahamas, who says "henneqiin," or "dagger plant," the fibre of Yucatan, and not sisal, grows all through the West Indies. In Yucatan there are two varieties, the Bahama and another. Mr. Morris imported in error an aloe from Ceylon, which was planted in Jamaica and probably in other islands, but I do not believe it is "hennequin," neither do I believe the dagger plant to be hennequin. As to the statistics referred to, all sorts of mis-statements were made under the "Shea" administration, so Mr. Churchill's estimates may be more correct; but I should mention that an acre of land in the Bahamas must not be confounded with an acre in this country; the first would probably be equivalent to one-fourth of an English acre, probably less, so much of the land being nothing but plate rock. "Observer" is right as to the question of origin: that has been settled in the minds of all truth loving people by the *Refutation of a Romance of a Governorship*, but I have already had my say upon this point. On Mr. Chamberlain's speculation in sisal I need not enter, except to wish for his own sake he had bought the lands I pointed out to him. Results might then have been very different, and the colony would not have lost the great assistance in its development which his investments in the islands would have brought; but under the influence of Sir Ambrose Shea he did otherwise. I wonder if Sir Ambrose's friends give him credit for this disastrous result of his want of judgment and knowledge. "Observer" refers to the "Crown Fund" of the colony. I am of opinion that, under the sole control of many Governors, it has not been properly administered. The "options" given on land, for instance, were without any binding agreement or fine, and so the fund is not nearly so large as it ought to be, if any reasonable foresight had been exercised. Really, this Colony manages its own affairs so intelligently, that it would be well if Mr. Chamberlain turned over the Fund to its Legislature, who are the proper parties to administer it.—Yours truly,

AUGUSTUS ADDERLEY.

SUGGESTED DANGER FROM ARTIFICIAL MANURES.

(*A tit-bit for Ceylon's daily alarmist.*)

The "Lancet" says:—"During the past week our laboratory commissioners have undertaken the examination of a number of substances, including certain foods and drugs in common daily use, in the preparation of which sulphuric acid is used. It will be found, after a few moments' consideration, that a fairly lengthy list of articles of everyday use may thus be drawn up. The results are not yet ripe for publication, but we feel bound to divulge one important result, since the disturbing announcement has this week been made by the analyst of Manchester that arsenic has been found in malt in a quantity equal to that found in glucose or malt substitutes. Moreover, arsenic was found in beers which were known to be brewed from malt and hops only. Now that this remarkable statement has been made, we may say that we have found, in the course of the inquiry alluded to, artifical manures to be rich in arsenic easily soluble in water. This is hardly surprising, since the basis of artifical manures—namely, superphosphate of lime—is made by acting on ordinary done ash with common oil of vitriol. The important point is that it has been established that plants to which arsenical manure is applied take up arsenic in their tissues. Cabbages and turnips gathered from fields manured with superphosphate have given unmistakable evidence of the presence of arsenic. It is probable that arsenic accumulates in the soil which is constantly being dressed with superphosphates, so that plants raised on such soil would absorb arsenic and exercise an injurious effect on the health of man and animals. The question arises, therefore, may not the arsenic in malt be traceable to the somewhat large amount of arsenic inevitably present in artificial manures? This aspect of the subject is very serious, and needs further inquiry. We shall return to it in a future issue, when we hope also to be able to record the results obtained in an examination of other more or less familiar articles in which arsenic may be possibly introduced through the employment of impure sulphuric acid in the course of the manufacture."

TEA; POSITION AND PROSPECTS AT END OF YEAR IN LONDON.

McMEEKIN & CO.'S NOTES ON INDIAN AND CEYLON TEAS.

INDIAN.—As practically all Teas on which duties were paid in anticipation have now passed into ordinary consumption, the annual summary may be taken as fairly correctly representing the year's trading in tea in the London market.

From the producers' point of view, the statistical position cannot be regarded as at all satisfactory. The imports during the calendar year showed an increase of some 12,000,000 lb., while the deliveries only increased by about 4,000,000 lb., and it must be remembered that of this increase over 2,000,000 lb. went into Export trade. It is evident that Ceylon teas have again gained materially in home consumption as compared with Indians, the reason doutless being the lower level current for the former during a large part of the year. For two months, however, quotations for Indian teas have been very low, and the effect is being quickly seen.

At the close of the year the total of seasonal imports recorded showed an increase of about 3,000,000 lb. only, while up to the same date some 9,000,000 lb. in excess of the 1899 figures had been shipped from Calcutta alone, irrespective of the increase due from Southern India. Besides, the quantity offered to date for the seven months was much below the figure for the same seven months of 1899 and the accumulated stock showed an increase of 8,500,000 lb.

The position is a most serious one to face, as, in addition to the London market being oversupplied, the other important outlets—Australia and America—are in a most congested state owing to the excessive shipments injudiciously consigned to them; and the strong demand from Eastern Europe has been temporarily well supplied.

A proposal is now under discussion to arrange for a voluntary limitation of production during 1901 by a mutual arrangement of producers. Should anything of the kind be arranged an made effective by the conclusion of Ceylo

growers, it must rapidly and seriously affect prices. A reduction of even five per cent in the yield from both India and Ceylon could not fail in present circumstances to lead to a marked advance in the value of the remaining 95 per cent produced.

CEYLON.—The statistical position appears rather more favourable than that for Indian teas. Within 1900 there was an increase of 15,000,000 lb. in the imports, while the deliveries showed the marked advance of 11,700,000 lb., of which under 2,000,000 lb. went into Export Trade. The large advance in home consumption has been bought at a heavy cost in the level of prices realized. The year closed with an increased stock of 8½ million pounds, while the quantity shipped from Colombo to London within 1900 exceeded that received in the latter by fully 3 million pounds. The congested state of other large markets, referred to above, affects Ceylon tea fully as much as it does Indian, and serves to explain the very heavy export from Colombo to London during December. It may also have an important bearing on the volume of shipments to London during the early part of 1901.

The expectations of yield for the new year again point to probable large increases, if no steps are taken in the direction of restricting output.

COFFEE AS A BEVERAGE.

SIR,—I notice that a great deal is being said at the present time in the public Press regarding the remarkably small consumption of coffee in England. It appears that more than 30 times as much coffee per head is drunk in Holland as in England. It also appears that the United States of America is an extremely large consumer of coffee; in fact, nearly half the coffee produced in the world is consumed in that country. As the Americans and the English are practically of the same race one would naturally suppose that the consumption of coffee per head would be about the same in both countries. Various writers have lately been attempting to arrive at the cause of this great disparity in the consumption of coffee. Why is it that England consumes such a small quantity, and Holland, Germany and the United States such an enormous quantity? One writer speaks of coffee in the following language :—"Coffee affords the human frame energy and vigour, and consequently ameliorates the ill-effects of overwork or excessive study, and neutralises the consequences of deficient, poor, or unwholesome nourishment."

The coffee berry in its raw state contains, on an average, about half of one per cent of caffeine. Caffeine acts as a stimulant. It strengthens the action of the heart, and stimulates the whole vascular system. It removes fatigue, and, in fact, has an exhilarating effect similar to alcohol. Caffeine is the only substance known which can produce these exhilarating effects without an after depression. When coffee is well roasted and well prepared drinkers acquire a certain coffee habit very much like that of smoking. In some countries, like Greenland where no alcohol is either imported or made, the natives produce a species of intoxication by drinking very large quantities of strong coffee. If anyone is a habitual coffee-drinker, he feels great depression if he misses having his coffee at the usual time.

In the United States of America there are absolutely no restrictions on the importation of coffee or on its use. Even when coffee was dutiable, after the duty was once paid the purchaser was at perfect liberty to do anything he liked with the coffee. But in England the case is quite different. The Government is not satisfied with simply receiving the duty ; coffee is hampered in every way by restrictive laws. No other adulterant is permitted but chicory. In France the children are provided in the morning with a large cup or bowl of coffee and milk, into which they break their bread, and eat it very much the same as they would eat bread and milk. In the United States a very cheap drink is prepared by mixing roasted cereals with coffee, which is practically the same thing as mixing bread with coffee. In this way a very delicious and cheap beverage is produced, which is not only stimulating in proportion to the coffee it contains, but at the same time serves as an excellent food. A cup of so called coffee prepared in this way is quite as good as a bowl of soup, and what is more, it is exceedingly cheap and palatable. It is because the Americans are allowed to use coffee in any way they like, either as a beverage or as a flavouring material, that the consumption is so extremely large.

In England, on the other hand, coffee can be adulterated with nothing but chicory, because chicory pays a duty. Now it so happens that chicory is a root, not altogether unlike beetroot. It contains a large amount of very impure sugar similar to raw beetroot sugar. When this chicory is properly roasted, it communicates to the coffee a great deal of colouring matter. Moreover, the roasted impure sugar which it contains becomes extremely bitter ; and as an adulterant of coffee, as far as bitterness and colour are concerned, nothing could be better. When the quantity of chicory is limited to one-third of the whole, it produces a very pleasant drink ; but unfortunately chicory has a medicinal effect. It is like a great many other things which may be quite palatable at first ; but if chicory is consumed day after day one soon tires of it, as it is like all other impure sugar. It produces slight nausea, and in this way, unless one has a very strong stomach, it soon becomes quite unpalatable. Therefore, as coffee is always associated with chicory in England, coffee is discarded because the consumer finds that chicory causes indigestion, and does not agree with him. As coffee contains only half of one per cent of caffeine, and as a large amount of this is dissipated in roasting, and as the relative amount is still more reduced by the addition of chicory, it follows that the actual amount of caffeine contained in an ordinary cup of coffee, such as one finds in England, is quite insufficient to produce any exhilarating effect. On the other hand, tea contains sufficient caffeine to produce a perceptible amount of exhilaration. The result is that people take to tea and avoid coffee.

If the Government really wished to increase the revenue from the importation of coffee, the best course would be to let people adulterate it with anything they saw fit, instead of confining them exclusively to chicory. In countries where common cereals are used for adulterating coffee people never tire of it, but in England, where only chicory is used, coffee has become very unpopular.—Yours, &c., HIRAM STEVENS MAXIM,

—London *Globe*.

A THRIVING WATTLE PLANTATION.

On the mountains, not far from Maritzburg, in Natal, the Town Hill Wattle Company eight years ago acquired a tract of 3,000 acres, and commenced to plant wattle trees for bark. At the present time 2,400 acres are planted, the trees standing six feet apart in rows twelve feet wide. The soil is poor in quality, of a red colour, and light and porous. A correspondent of the Natal *Agricultural Journal* recently interviewed the manager of the plantation, Mr J A P Ellis, and it is thought the following particulars from his report may be of considerable value to people in New South Wales interested in the production of wattle bark, for which there is so great a demand and so little provision. The land is broken up about Christmas-time and well harrowed. In February the planting is done, and the ground receives no further attention until the autumn of the following year, when the space between the young trees is ploughed to aerate the soil, and at the same time protect the trees from the ravages of fires. Trees in Natal do not reach their prime, either as regards bark or timber (the company have a market for all their wattle timber for mining purposes and firewood) till about the tenth year. Insect pests, in the shape of locusts and bag-worms, do considerable damage to the trees, and grass-fires are a great source of anxiety. "In August and September no plantation in Natal is absolutely safe in the event of fire starting with a high wind, for the undergrowth in most cases is sufficient to feed a fire in hot wind." To protect their plantation, the company have nearly fifty miles of fire-breaks, boundary and dividing. It is costly work, but is regarded as a sort of insurance premium. The stripped bark is brought in by means of a tramway, which also connects with the nearest railway station.

The shed for drying the bark is 250 feet in length, with its back to the weather quarter. From the back, along the whole front of the building, a series of very broad-gauge tram lines, six feet six inches orom the ground, on wattle posts, like an overhead railway, run out a distance of 126 feet. On what may be called these tram-lines there rests a flexible ladder of thin poles overlapping the rails on either side by a foot. The sides of the ladder are light chains, a dog-spike at the extremities of the wire rungs entering the chains at fifteen inches apart. The last rung is a stout pole for the hauling wire, which wire runs over a pully at the extremity of the tram line. As the bark arrives for drying it is thrown over the rungs of the extended ladder. When rain or mist threatens, a wire from the back of the shed is drawn by a couple of oxen, and the flexible ladder with its load comes under the shed, the load of bark hanging from each rung being closed up compactly like the bellows of a concertina or the laths of a venetian blind, if they were run in horizontally from a couple of guides. On the return of fine weather, the ladders are again drawn out. The capacity of the shed is one hundred and twenty tons. At one time there was apprehension that it might become necessary to send the wet bark down the hill below the mist line for drying—for much depends on the proper drying of bark —but this system of shed drying has disposed of the necessity for such costly procedure.

Close by is the shed for chopping the bark, sawing the poles, &c., the motive power being a twelve-horse-power engine. All the machinery is well set on exceptionally solid foundations and the shed seemed advantageously planned for avoiding unnecessary handling, both as regards the placing of the machinery and the run of the tram sidings. In reply to a question, Mr Ellis said he had not been able to do anything profitably with tannage or cutch. The former, as many know, is an infusion of tannic matter derived generally from the waste small branches of the tan trees, and the latter (cutch) is the same inspissated—evaporated to a solid consistency. For making cutch, he said that a plant of vacuum pans, &c., costing £8,000, would be required.

From a commercial point of view the company's operations have been attended with great success.—From *The Agricultural Gazette*, New South Wales, for December.

RUBBER TRADE IN LAGOS.

At a meeting of the Manchester Chamber of Commerce, on the 12th inst., Mr. John Thomson, president, in the chair, the minutes of the African Sectional Committee containing the report of a discussion by the committee on the Lagos rubber-tree regulations, which were recently brought under its notice by the Lagos Chamber, were laid before the Chamber. The "Manchester Guardian," in a report of the above meeting, states that it appears that, with a view to the preservation of the rubber industry, the Lagos Colonial Government has placed restrictions on the "tapping" of trees and the sale and purchase of rubber in certain districts. The Lagos Chamber a few weeks ago addressed a letter to the Lieutenant-Governor of the colony urging that these restrictions should be removed, or at least modified. It was stated that "trade is extremely bad in the colony, and the Chamber is of opinion that it is partly due to the restrictions, which are diverting the rubber industry to other colonies." The African Committee having last week had the advantage of an interview with Sir William M'Gregor, the Governor of Lagos, resolved to recommend to the Board that a letter be addressed to the Secretary of State for the Colonies to the following effect; (1) That the Chamber is not sufficiently well informed to express an opinion on the demand of the Lagos Chamber that the restrictions on the rubber trade should be withdrawn. (2) That the matter is of sufficient importance to make it advisable that the Governor should receive instructions to inquire into all the points raised by the Lagos Chamber, after his return to the colony, so that he may be in a position to judge whether it is possible to modify the restrictions. (3) That in the opinion of the committee some restrictions are needed, and that the best way of making them effective is by securing the goodwill of the chiefs and by working through their agency. (4) That the chiefs should be encouraged to prevent overtapping the trees and to plant young trees in place of those which are killed. (5) That it is desirable to pass an Ordinance making it penal to buy or sell "root rubber." (6) That measures should be taken which will render it impossible for the native police to show the undue harshness to the people which is alleged to have been manifested. The Board sanctioned the despatch of a letter to Mr. Chamberlain in accordance with these suggestions. —*India-Rubber Trades' Journal*, Dec. 24.

HOW MUCH SEED TO USE.

Most people are very indifferent as to how much seed to use. In writing us for seed corn lately, some correspondents thought a quart of corn should plant one acre, others seemed to think that it would require a bushel. From my own experience, I find that four quarts will plant one acre, not more than four grains to a hole, 4ft by 4ft which is a good standard distance to secure a favourable return. Where rats and mice are giving trouble by eating out the seed, it is judicious to steep the seed in a decoction of bitter wood or in water with kerosene added, for a few hours, but even that does not secure immunity from some mysterious pests, (which I know are not rats or ants—the people say the offenders are frogs, but I do not beieve it) which scoop out a hole and do away with the grains. For this reason, it is better to drop six or eight seeds in the hole and thus give a better chance to secure

a good stand. It is easier to pull some of the plants out if too many escape harm and come up than to go and plant more seed, for nothing is more annoying than to have to do this; you have to make holes again, even though the ground have been ploughed, drop seed, cover up and after all, these later plants never do well, for they are shaded by the older plants and dwarfed from the start. Therefore in planting six or eight seeds to the hole you would allow eight quarts to the acre. With pumpkins which can be planted through the corn after it has half grown, two to three pounds per acre is the rate for seed setting. As a general rule the following will be found fairly correct:—Beans in drills 1½ to 2 bushels; Peas in drills 2 bushels, broad cast 3½ bushels; Corn in drills ½ bushel; broadcast 3 bushels; in hills 8 quarts; Guinea Corn, broadcast or hilled 1 bushel; Cow peas to 8 quarts; Rice 30 to 40 lb: Cabbage (in seed bed to plant an acre) 2 lb; Guinea Grass 1 to 2 bushels; Turnips in drills 2 lb; Jerusalem Artichokes 3 to 4 cwt. "Red Peas" allow a bushel per acre in holes, tomatoes 1 ounce to 1,500 plants, egg plants 1 ounce to 1,000 plants, onions 5 to 6 lb, potatoes cut in two sets 12 to 14 bushels of whole potatoes or allow 4 to 8 barrels to plant whole or in sets. The weights in lb per bushel of different seeds are:—Beans and Peas 60 lb. Beggar Weed 60 lb. Guinea Grass 20 lb. Guinea Corn 40 lb. Country Corn (Maize) 56 lb. Oats 40 lb. Wheat 60 lb.—*Journal of the Jamaica Agricultural Society.*

RUBBER FIND.

A great discovery of india-rubber forests of vast extent has been made in the Department of Santa Cruz de la Sierra, and on the Magdalena in Bolivia. In the province of Caupolican, Department of La Paz, there have also been discovered some splendid forests, in which there have been found some rubber trees of a species not before known.

In Bolivia the only species of rubber trees hitherto worked are those known as "Hevea," or "Siphonia Brasiliensis," but lately the species known as "Castilloa, which exists in Mexico, Colombia, Equador, Central America, etc., has been dicovered.

In the Province of Caupolican gutta-percha has been discovered, which is very important. In order to facilitate shipments for the products of Santa Cruz and Beni, the Government has decided to open a port with a national custom-house, on Laguna Gaiba, a beautiful creek of the River Paraguay, on its right bank, at 17 deg. 48 S. latitude.—*India-rubber Trades Journal*, Dec. 24.

THE SUMATRA FIBRE PLANTER.

TOBACCO ABANDONED FOR RAMIE.

Mr. Bluntschli, with a friend, visited the Peradeniya Gardens on the 18th and enjoyed a round of the Gardens—being of course chiefly interested in fibre-plants, more especially Ramie, which he grows on a large scale in Sumatra. He has had nearly eight years' experience of Ramie cultivation now, so that he can speak with authority on the subject. It is not however every planter who can afford the patience or means to persist for seven years(!) at a cultivation like Ramie, as Mr. Bluntschli has done, before any profits are reaped. Previous to this he grew tobacco extensively, but becoming dissatisfied with the returns from this he ventured to try Ramie on a large scale, which is the only condition under which it can be made profitable. But it was a case of "out of the frying-pan into the fire." Still, patience has its own reward, and Mr. Bluntschli is now sanguine of respectable and steady returns, for he now employs 24 decorticating machines at his different factories, which are all lighted with the electric light. Mr. Bluntschli grows six distinct varieties of Ramie. though he considers there are no less than thirty more varieties in existence. Yet he was shown a species at Peradeniya which was quite new to him, viz: *Bœhmeria pulchra*, which as the name signifies, has beautiful velvety dark-green leaves. This seems to contain as good a fibre as any of the family, and is easily grown. *B. nivea* Mr. Bluntschli considers the best, and he confirms local experience (in the Gardens) by condemning the variety *tenacissima*, which is often said to be the best variety for high elevations. Mr. Bluntschli purposes a visit to Mr. Power's ramie clearing before leaving the Island. Then he goes on a tour to China and Japan for the purpose of acquainting himself with the methods of Ramie cultivation in those countries and with the different varieties grown.

THE NILGIRI GAME ASSOCIATION.

This Association held its annual meeting on Friday last at the Collector's office. There were present Sir Frederick Price, Messrs. C M and W Mullaly, Colin Mackenzie, H P Hodgson, Herbert Browne, Van Ingen, Wilbraham, Church and Captains Bagnalls, Van Agnew and Swan.

The Honorary Secretary, Mr G Hadfield, presented a Report of the year's operations of the Association, which was recorded satisfactory. Of the prosecution under the Game and Forest Laws detection had considerably improved owing chiefly to the appointment of two competent watchers, at Mettapollium and Satymungalum ranges.

The other measures of game preservation referred to was the destruction of vermin. A schedule of what had been done during the year is appended to the Report and testifies to rewards having been paid for 141 eagles, 279 wild cats, 65 mongooses, 24 cow pheasants, 13 wild-dogs and an otter. These figures were in excess of those of the previous year.

The question whether there had been an increase of game as the result of measures of protection was answered in the affirmative and the amount of success achieved, the Secretary contended, justified perseverance in the course adopted.

Among measures inaugurated during the year was the Game Bag and Shikari Register. Mr. VanIngen was the only contributor to the former and from lists of game shot in the district furnished by him, it appeared that 11 sambur, 1 spotted deer, 3 tigers, 4 panthers, 5 bears, 4 muntjack, 2 black bucks and 1 hyæna, were destroyed.

From the details supplied in Mr. VanIngen's list, we learn that the largest stag, with 34 inches of antler, was met with on the slopes of the Nilgiris, while the Kundahs and the Drug furnished two others of 33 and 32½ inches, respectively. The spotted deer was shot on the Westbury estate and the length of its right horn was 32 inches and of its left 31. The biggest tigers killed

were one male on the Kundahs and a female at Westbury each measured from nose to tail 9 feet. Westbury also supplied Mr. VanIngen with the largest skin to eure, which measured 6 feet 8 inehes. Nellacotta, in S-E Wynaad, aeeounts for the largest bear destroyed, which measured 5 feet 11 inches, and was a male,

The meeting then adverted to the trout eulture, undertaken by the Association; and to Major Bagnall having taken up the duties so ably performed by Major Grant, V.C. Major Bagnall arranged what he had to communicate under 3 heads—(1) attempts to procure ova, (2) the evidence of the existenee of trout in Nilgiri waters (3) the existence of other fish. Two consignments of ova were sent by Messrs. Andrews and Andrews, of the Surrey Trout Farm, the first consisting of *S. Fario* by the "Golconda," the second of the American rainbow trout or *S. Iridens* by the "Manora." Every precaution was taken this side of Madras, but owing to the apathy and utter want of appreciation of what was required on the part of the individual into whose custody they were delivered on board the ship, both the consignments arrived in a hopeless eondition.

H.E. Lord Ampthill, it was resolved, should be asked to become the Patron of the Association, and a few additions were made to the Committee or the year.

CINNAMON IN LONDON.

It was scarcely to be expected that the extraordinary prices which some parcels of fine Cinnamon fetched at the August sales would be maintained. It is not surprising, therefore, that at the last quarterly sale for the year, held in Mincing Lane on the 26th ultimo, prices receded to the extent of 1d to 2d per lb. This falling-off was, however, only on the qualities which had received an abnormal fillip, and it represented a return to the range of prices which had previously ruled. A fictitious or unusual rise generally does harm by inducing illegitimate speculation; and if some people feel disappointed that the August prices were not maintained last month, they should derive consolation from the fact that there was not a serious drop, by way of reaction, and that prices were not forced down by an excessive supply. The finer qualities which are usually "worked" in London, by being unbaled, examined and re-baled, all found buyers at prices which must be considered satisfactory—the difference between the bids for the three First sorts being far less than usual, and one lot of Seconds actually fetching top price! Only about one-half of the offerings of "unworked" spice found buyers in the room; but the drop in their price did not exceed ½d a lb., for marks on which August prices were not maintained. The quantity catalogued was a fair average one, and the leavings need not mean accumulations, as Cinnamon is generally taken off at auction prices soon after the sale. The prospects of the spice may, therefore, be regarded as good, looking both to prices and stocks. Another circumstance which renders the outlook hopeful, is the determination of the trade to have nothing to do with so-called wild Cinnamon. Would that it were possible to secure a similar, effectual boycott for rubbishy Teas, by which we do not mean sound Teas of inferior quality—Cinnamon counts four sorts—but Teas manufactured of coarse leaf, leaf that does not roll, and adulterated with stuff that does not generally enter into consumption as food. We quote as follows from the Cinnamon Report of Messrs, Forbes, Forbes & Co., Ld.:—

CINNAMON.

London, E.C., Nov. 27.

The last series of quarterly sales for this year were held yesterday, when a total offering of 1,587 bales plantation Ceylon quill was catalogued, against 1,141 bales in August, and some 2,900 bales plantation at this period last year. With only a moderate enquiry, about 900 bales passed the hammer at generally easier prices. The exceptionally high prices realised for "Worked" quill at the August auctions were not maintained, as we had anticipated, and prices for these marks then unduly forced up, now gave way to the extent of 1d. to 2d. per lb. The "Unworked" spice realised about last sale prices to one halfpenny per lb. decline. The whole of the "Worked" quill —296 bales—was sold, firsts 1/4 to 1/7; seconds 1/2 to 1/7; (one lot at 1/8; thirds 1/1 to 1/6; fourths /9 to 1/; of the 1,391 bales "Unworked," 601 bales were cleared, firsts 11d. to 1/; seconds 9½d. to 11d; Thirds 9½d. to 10½d; fourths 9d.

A few lots quillings and chips sold, the former at 7½d. to 10d. per lb., and the latter at 3¾d. per lb.

1401 bales and 2,500 bales wild cinnamon and bark were again brought forward and, as before, were totally neglected.

Stock of Ceylon	3,032 bales quill 2, 2,446 ,, wild	against	1899. 3,659	& 1898. 6,116
Chips	2,743 bags		1899.	1898.
Wild bark, &c.	7.450 ,,	,,	6,705	& 1,920

The next public sales will be held 26th Feb. 1901.

Owing to the strike of Thames lightermen the Cinnamon on board, the SS. "Alcinous" was shut out of the auctions.

SOME NOTES ON CHRISTMAS FRUITS.

By Sampson Morgan.

The present Christmas season will be eonneeted with the fact that it is a record one as far as the supply of fruit is concerned, and that never before has there been such a varied show of festive dainties in the windows of the fruit-shops, not only of London but of the United Kingdom. Until a few years ago the fruit-supply for Christmas was confined to a few well-known fruits, sueh as the grape, orange and apple; now shippers ransack every quarter of the world for new fruits, so that they may be put on the markets at a time when an insatiable demand and high prices prevail. That is why this Christmastide we have the grape-fruit from Jamaica, the persimmon from the South of France, the custard apple from Madeira, the mango from the Canaries, lychees from China, and golden-skinned apples from the Pajaro Valley. This apple is known on the English markets as the Californian Newton pippin. It is, however, nothing of the kind. It is the Pajaro Newton, and is grown in that fruitful valley from whence it derives its eorrect name. One faet about the development of the Christmas fruit-trade deserves a speeial notice. The public is inelined naturally to take it that we are as a nation importers of Christmas fruits, and importers

only. This is a slight error. At the present time English hothouse grapes are on sale in the leading fruit-shops of Berlin, Paris and New York. The English hothouse grape stands above all competitors, and is of magnificent appearance and quality. These grapes will be on the tables of many of the richest families in Germany, France and America, this Christmastide, and the fact, though generally unknown, deserves notice. But things will not even be permitted to stop here. We suggested the development of the export fruit-trade from this country to the Continent many years ago and now a Covent-garden firm has, we believe, opened a shop outside the Halles Centralles in Paris, so that best English fruits will be obtainab'e in Paris in large quantities for the festive season.

Another important feature of the Christmas fruit-trade is the unique position taken up by the Denia orange. Of course, no city in the world is so well and cheaply supplied with oranges as London is. At one time the flat St. Michael was the Christmas orange; then it gave place to the round Valencia. This in turn was eclipsed by the oval-shaped Jaffa; then the Navel orange surpassed that, for not only was it of a similar shape and size, but contained no seeds. Higher prices in Canada and New York have diverted the supplies of Navels from London, so the Denia enters the list, and to-day holds a foremost position with all comers.

This Christmastide the English hot-house grape-growers have for the first time had to face serious Belgian competition. True, Belgian fored grapes have been sold in previous years, but this season the fruit has been put up in special little wicker-plaited baskets, and by this means have come to hand in perfect condition, with the bloom quite untouched and as fresh as when they were packed by the growers. The quality is not equal to the home-grown fruit, but they are excellent imitations, and few of the public will be able to tell whether they are buying English or foreign fruit. Great expectations had been raised with regard to the arrival of huge quantities of bananas from Jamaica, but the public will have to depend upon the shipments from Madeira and the Canaries for the yellow-fingered fruits this Christmas-time. Without doubt the quality of the Madeira banana is as near perfection as possible. The banana is the coming fruit. It is wholesome, highly nutritious, and when fully ripe may be said to be devoid of starch, hence its great value as a food product. Among dates those that come from Tunis are immensely popular, and the public prefer them to the Tafilats, which are sold loose, though the latter are twice and three times their size. Then there are the Elvas and Carlsbad plums. These have met a larger sale this season than ever, and have taken a good hold upon the public taste. The American figs in little wooden drums are also highly appreciated. Lady-apples from France, packed with dyed moss and with one layer of crimson-cheeked fruits in a case, have become so much sought after that they will command high prices this year.

Nuts are plentiful—the cokernut (*sic!*) particularly so. What wonder when we know that in Ruatan, off Spanish Honduras, the Carib Indians never work, because the cokernut trees drop their harvest of nuts about them, and repeat the process for half a century before losing their fruitfulness. In other parts of the world it is the same, and the cargoes which reach us from Trinidad and elsewhere prove the prolificness of this wonderful tree. Brazils and almonds are plentiful. Kent cobs are abundant, so are the small Spanish nuts, There are good stocks of chestnuts on sale; the best come from Naples. France sends a good-quality nut to this country. Walnuts are represented by samples from Naples and Grenoble. The former are kiln-dried, and the latter what are termed fresh. In its dried state the almond is known to everyone in this country now. In Italy their culture for commerce receives special attention. Around Catania and Syracuse they are grown in profusion, but the nuts are also eaten when they are soft and green as a dainty by the rich classes. In either form, whether green or ripe, they are a useful article of diet, and always appreciated. The almonds of Catania are well known in fruit-trade circles.

In addition to the other dried fruits that have been named there are huge stocks of figs, and a fine and varied display of fruits in thick sugary syrups.

Possibly in time we shall have the privilege of adding a considerable number of fruits to the extensive list we already possess. Were the fruit-growing centres of India alone exploited by dealers as they should be, we should soon be having a plenteous supply of oranges, bananas, custard-apples, guavas, pomegranates, limes, lemons, dates, figs, and mangoes from that possession alone, and in prodigious quantities too. As to melons, those of India are of the finest quality, and would be prized in this country.—*St. James's Gazette.*

DESTRUCTION OF GAME IN INDIAN NATIVE STATES.

Government would do well to direct attention to the game laws and their administration in Native States. In Mysore it appears that a wholesale destruction of game takes place all the year round, whilst a gun license may be had for the nominal sum of four annas. No animal is spared, whatever its age, sex, or season, and the result will be that eventually not a living thing will be left in the forests. The rivers also are suffering from netting, and representations by the local Government appear to be barren of result. In Hyderabad half the State is annually closed to European sportsmen, but the destruction by native shikaris proceeds apace in a country where every man is armed. The natives, however, destroy only harmless animals, and do not keep down beasts of prey, with the consequence that the latter prey almost entirely on domestic animals and not infrequently take to man-eating; the predaceous animals are thus likely to largely increase in numbers and destructiveness.—*Asian*, Jan. 15.

THE FORTHCOMING BURMA RICE CROP, according to the estimate, will be the largest on record. As it is to be hoped there will be no famine in India, prices will probably be lower than those of 1900. In Siam the prospects of the present crop are said to be excellent, and Bangkok and Saigon will doubtless supply a good deal of the demand for China and the Straits. Japan now buys Burma rice pretty regularly, finding it more profitable to export her own grain. No attempts seem to have been made to introduce the Japan variety of rice into the province and it might be worth while to experiment in doing so.

REPORT ON CEYLON TEA, 1900.

EWART MACCAUGHEY AND COMPANY, LIMITED.

The New Year's Auctions opened pretty well on the same lines as Indians. The market was strong up to 7½d per lb while over this prices were irregular, although, where quality was unmistakably good, buyers were prepared to pay up. A fair amount of Pekoe Souchong for price was available at 6½d per lb, and Broken Pekoes generally were relatively much cheaper than leafy grades. The very strong tone died out towards the close of the month and partly owing to inferior quality, but chiefly no doubt in sympathy with Indians, prices fell all round until 6d per lb teas in particular were showing wonderful value.

In February better teas brought a better market, and with both home and export buyers coming in and fine teas in small compass, prices advanced, finer kinds selling up to 1s 7d per lb or 1s 8 per lb, while in Common Leaf there was no quantity to speak of under 6½d per lb. Prices for Common did not, however, remain up very long and the end of the month brought lower quotations for all tea under 7d per lb with a fair number of 5¾d per lb quotations.

The first auctions after the Budget opened with an irregular tone and very shy bidding, Pekoes at 6d per lb, wonderfully cheap, and tea generally a full ½d per lb down from highest point. Quality was improving, and in March we had a strong enquiry for fine teas, while at the other end of the gamut low grades had receded to 5½d per lb. Throughout April and May quality was indifferent, but prices were useful, and with 6d per lb grades showing wonderful value a large business was done, the blenders in particular operating freely as prices exactly suited them. All the enquiry was however for leaf, and Brokens were going anyhow.

May closed quietly with bad tea and easier prices. There was plenty of Pekoe Souchong and Pekoe at 5½d per lb., and a fair amount at 5¼d per lb. Enormous quantities were being offered and this not only killed the Ceylon enquiry but reacted on other markets as well. Poor quality and more tea than the trade wanted at this time of year had brought down the average price to 6¾d per lb. as against 7½d per lb. in the previous season.

In June again the market was entirely overdone with tea and prices receded to 5¼d per lb. for leaf and 5¾d per lb. for Broken, practically the whole weight of tea selling between 5d per lb. and 7d per lb.

Quality improved in July and a better market resulted, and by the end of the month the average price had risen to 7½d per lb., with 5½d per lb. representing about the lowest price for common leaf. Auctions had been heavy right through what is usually the slack season and this led to a deal of fluctuation in prices, and by the end of August we had a decidedly slumpy market, with a much larger supply of 5d per lb. and 5¼d per lb. tea. This feeling was even more pronounced in September, and the very bad condition in which a large proportion of the tea was landed tended to create a further knock-out in prices.

Quantities dropped off a little in October, and there was rather less 5d per lb. tea, but, except in the case of finest, there was a poor market. Free buying in the upper grades, especially by the blenders, hardened up prices for anything with quality, and to show that fine tea is appreciated, there were Pekoe Souchongs selling at 1s per lb. and 1s 1d per lb. during the brief period in October when really good tea was being offered.

The last two months of the year showed a continuously weak market for Common and unfortunately the very low class of much of the tea offered (the worst ever seen) tended to keep down quotations, and to discredit Ceylon Tea generally. That buyers would rather deal in good articles was shown by the fact that while the grades up to 5d per lb. were neglected, there was nearly always a strong enquiry for useful medium between 6d per lb. and 9d per lb.

During the past twelve months it was more than ever noticeable that the planters are sacrificing quality to quantity, and this is much to be regretted especially as the export branch of the trade has of late years steadily increased. The Continental orders are now an important factor but if Ceylon tea is to hold its position, quality must be considered as of the first importance.

A result of the low prices, and a most satisfactory one, was the very considerable increase in the Export of Indians and Ceylons to other countries and this opening up of new outlets capable of absorbing large quantities must prove of the greatest value in the future.

After the experiences of the past season planters will doubtless see that it is to their interest to reduce production by plucking finer, and we hear that proposals are afoot for combined action by both Indian and Ceylon Garden Owners to bring about this desirable consummation. If carried out efficiently this would be an enormous advantage to every branch of the trade as it would raise the standard of quality all round.

An unsatisfactory feature has been the large proportion of tea which was laid down here in a tainted condition. A certain amount of friction and endless trouble has resulted, and never before have we seen anything like the same number of parcels thrown up or contracts cancelled. Unsuitable packages, no doubt, largely account for the flat teas, but in the case of real taint we are bound to look for other causes, and shippers, rightly or wrongly, are becoming very suspicious of some of the steamship lines.

PLANTING NOTES.

A LARGE AUSTRALIAN PUMPKIN.—Canon Garland has sent to the Minister of Lands a huge pumpkin, of the ironbark species, which was grown by the boys of the Swan Orphanage. This great vegetable when weighed turned the scales at 30 lb. —*Westralian paper*, Jan. 14.

THE SEYCHELLES.—Mr. CHAMBERLAIN has given his sanction to the establishment of a botanic station in the Seychelles, which, with the co-operation of the Director of the Kew Gardens, will be started on the first day of the coming century. Some people have actually assigned the site of the Garden of Eden to the Aldabra group in the Indian Ocean, now famous for little else than the gigantic land tortoises, of which so many have been sent to the Zoological Gardens through the instrumentality of the Hon. WALTER ROTHSCHILD, M.P. Every description of plant which is likely to be of the slightest economic value will be obtained from other countries, and the treatment of the soil will be made the subject of special experiments. The islands are in direct communication by steamer with Colombo, Mauritus, Aden, Zanzibar, and Bombay, a factor which is likely to play an important part in the development of their internal resources. Our contemporary, the *Daily News*, overlooks the famous double-cocoanut, around which so many legends have collected, the most fantastic being the theory of the late Gen. GORDON above alluded to, that this was the forbidden fruit.—*Gardener's Chronicle.*

THE WORLD'S SUGAR.

The map which we print on page 11 shows roughly the area of the world where sugar is produced. It will be seen that the sugar-cane is not cultivated beyond the 40th parallel of latitude while the beet can be grown to the 60th parallel. Until a few years ago sugar was extracted from the cane in the warmer latitudes by an antiquated method of labour and ineffective system of machinery, but as a good price was obtained for the sugar no attempt was made to improve the methods of production. It was never anticipated that sugar could be produced in a comparatively cold climate, and when the beet sugar came in the sugar-cane planters were quite unprepared for the new development. They had to face a fall in prices, the introduction of bounties, and improved methods by capitalists and companies in other hands and they went under.

Beet sugar is now grown in most of the countries of Europe, and the following figures, which are published by the International Union for Statistics on Sugar, show the number of acres that have been planted with beet sugar seed.

BEET SUGAR PLANTING.

Country	1899 Acres	1900 Acres	Increase Per cent
German	1,057,939	1,090.521	3·1
Austria-Hungary	804,063	839,151	4·4
France	626,480	685,391	9·4
Russia	1,261,614	1,356,075	7·5
Belgium	158,235	170,028	15·0
Holland	109,703	112,878	2·9
Sweeden	65,238	71,271	9·2
Denmark	34,594	34,594	—

The beet sugar production of Europe this year is over 5,500,000 tons, while the production in the United States amounts to 73,000 tons. The beet sugar shows an increase over 1899 of 500,000 tons, while cane sugar shows a decrease of 250,000 tons. The Louisiana crop, according to the New York *Journal of Commerce* is put in at but little more than half of what it was last year, the Porto Rico crop is charged with a large ratio of decline and the Cuban crop is sat down for 45,000 tons less than last year, and at much less than one-third of what it was in each of the two years next preceding the revolution. In Queensland and New South Wales the crop is estimated at very much below last year's figures, the decrease in the former colony being 40,000 tons or nearly one-quarter and in the latter 12,500 tons, or not much less than one-half.

To cope with the unremunerative nature of the cane industry, Barbadoes is endeavouring to obtain the capital to erect central factories which would enable the colonists to extract more juice out of the canes, and also to produce a better quality of sugar which would be more suitable to the Canadian and British markets. At present nearly all their sugar finds its way into the United States.

PROGRESS OF THE EUROPEAN INDUSTRY.

To show the progress of the European beet sugar industry, it may be stated that there are 213 factories in Austria-Hungary alone, the total output of raw sugar from this country in 1899 being computed at 1,083.000 tons. The Government set aside a sum of £750,000 for the payment of export bounties. The decision of the Legislative Council in Calcutta—following the example of the United States—to introduce a countervailing duty on bounty-fed sugar imported into India has made no change worthy of special notice in the trade between Austria and India. The chief burden of the countervailing duty, which is equal in amount to the export premium accorded to sugar in its country of origin, is thrown upon the Indian consumer, who has not only to pay more for the bounty-fed sugar, but also for the colonial sugar, which sympathetically rose in price.

Russia is now the largest producer of beet sugar in Europe, there being altogether 23 beet cultivating provinces in this country. The industry in Germany is able to keep going 400 raw sugar works and 150 refiners.

There are about 230 sugar factories now at work in Cuba, which is only about 60 per cent of what there were before the war. Owing to the present competition of beet sugar, it is unlikely that the mills which have been destroyed will be replaced. During 1899 about 324,000 tons were exported.

There has been an improvement in the sugar industry in Jamaica after a persistent decline for many years; 360,748 tons were exported last year. In British Guiana many of the sugar plantations can hardly pay their way, and future prospects are not encouraging. About 100,000 tons were exported from Georgetown, Demerara, in 1899. The whole of the sugar production of the Hawaiian Islands, amounting to 282,807 tons in 1899 went to the United States.

Large quantities of cane sugar are produced in Southern China, Formosa, Java, Philipines, Mauritius, Central and South America and other tropical and sub-tropical countries, but the rise of the beet sugar affects them all. The bounty system has also meant the ruin of more than one commercial house in this country. Bristol, which was once the centre of an extensive sugar-refining industry, closed the last of her refineries a little while since. In this country there are now only about five refineries—two in London, two in Liverpool and one down Greenwich way.—*Homepaper.*

THE REDUCTION OF THE TEA OUTPUT.

(To the Editor of *The Home and Colonial Mail.*)

SIR,—Last week you were kind enough to publish a letter we wrote you on the subject of over-supply and consequent low prices.

We are pleased to learn that this matter is being taken up energetically by influential producers.

Some three weeks ago we wrote a similar letter to that published by you to the Editor of the *Ceylon Observer*, and according to a telegram published in the *Daily Express* this week the idea has evidently caught on in that island, as the telegram reads as follows:—

"With a view to reducing the excessive production of tea, Mr. H. R. Rosling, chairman of the Ceylon Planters' Association, suggests that all Ceylon and Indian tea planters shall leave one-tenth of their tea unplucked for two years."

There can be no getting away from the fact that the law of supply and demand dominates the tea market as it does all others. In other words, the present demand must be increased or supplies must be curtailed in order to beneficially affect prices. The demand, or consumption, has been artificially reduced by the advance in the duty, and if any further change is made at the next Budget announcement the chances appear more in favour of a further advance than any reduction in the tax. There is, therefore, no hope of relief from materially increased demand, so that the question of supplies must be dealt with if the situation is to be improved, or even saved. If nature does not produce a diminished crop then some scheme of artificially accomplishing that end must be devised, and such a scheme must be thoroughly and enthusiastically carried out by all

concerned, whether growers of fine or common tea. It is a mistake to think that all parties are not in the same boat; it is the weight of tea that is crushing the market quite as much as, or more than, one particular class. Certainly the high grown estates are, and should be, getting larger proportionate profits on their smaller outturns, but how badly do those prices compare, speaking generally, with those ruling but a few years back. If there is a demand for 250 million lb. of tea, and 275 millions are supplied, then the market must decline whether all that tea is fine or common.

There is one other point we should like to mention, viz., that the idea of voluntarily plucking finer would not inspire confidence among buyers, as they would feel that in the event of a rise in price the method of plucking might be changed by telegram, and in six weeks or two months the market might be flooded and stocks greatly depreciated in value.

The producer must inspire confidence in the trade, and the same can only be done through reduction in the supply being absolutely assured.—We are, pear Sirs, yours faithfully, BROKERS.

RAISING OUR OWN NITROGEN.

Everybody believes that the soils of California are abundantly rich, yet in a Los Angelos paper, Professor A J Cook stated that the orange growers spend an average of $50 an acre for fertilizers. Florida needs fertilizers even more, but they believe there in raising their own nitrogen, not buying even cottonseed meal, except, perhaps, to get a start. Desmodium (beggar wee) cowpeas, and velvet beans, are legumes, and have power to draw nitrogen from the atmosphere through their rootlets, and transit it to the soil as food for future plant growth. Nitrogen is the most expensive element of our fertilizers, costing 17 cents a pound, while phosphoric acid costs 6 and potash 5. The planter should aim to raise everything that he must have, which he possibly can raise, instead of paying out his hard-earned money for it. No farmer can afford to buy rough nitrogen for fertilizer when he can so easily raise it. Desmodium makes the best of hay, if sown thick, so as to reduce the size of the stalk, and at the same time it enriches the land. If put in tall narrow cocks and capped, and left to cure for a few days without getting wet, then opened and aired for half a day before being hauled in, it makes the most valuable hay the planter can produce. Horses not only relish it, but they actually fatten upon it without oats or other grain. Immediately after cutting, another growth starts up and makes a heavy second crop. Some farmers prefer to save this for hay, because the rainy season is passed, while they cut the first crop and leave it to rot on the ground, as it comes in the rainy season.

The effect of this plant on the soil is almost magical. Not only do the roots draw nitrogen from the atmosphere, but they also run down deep and bring up mineral fertility to the surface. A Middle Florida farmer, a native of the State, and accustomed to Desmodium all his life, has stated that he raised a crop of corn for twenty years consecutively on thin, sandy land, and the yield increased a little every year, with no manuring except that given by a crop of Desmodium following the corn each year. There is something which cannot be explained which makes heavily-shaded soil gain in fertility. It is nature's way of enrichment. After plowing down this dead Desmodium one can grow almost anything with astonishing results; the shading of the land has made it mellow, and it is full of nitrates. Potatoes revel in such a situation; melons, pumpkins, cucumbers and beans grow like the proverbial gourd—Florida *Fruit Grower*.

TEA PLANTS FROM CHINA.

According to the "Annales de la Sociedad Rinalde Argentina," the Department of Agriculture in that country has procured a quantity of tea plants in good condition from China. These have been distributed among the State Agricultural Colleges for purposes of cultivation, and, as in the Argentines there is a choice of climates, it is anticipated that ere long a suitable locality will be found, and that an important development in the direction of tea cultivation may be looked for in the future. But, of course, there, as in most South American countries, the labour question is the lion in the way.

IMPORTANT IMPROVEMENTS IN TEA-LEAF WITHERING.

The results recently obtained in Ceylon from the artificial withering of tea-leaf are of so much importance to the whole tea industry that they deserve some special reference in our columns. Messrs. Davidson & Co., Limited, of Belfast, whose "Sirocco" Tea Machinery for every other process in the manufacture of the leaf is so widely knew and highly appreciated, claim the credit of having solved the difficult subject of tea leaf withering. The experiments made by them in this connection extend over a period of fourteen years, during which, and more particularly within the last four years, we believe, that they expended well on to £10,000 in apparatus, plus cost of conducting large scale trials in different factories in India and Ceylon before attaining the present satisfactory results.

These experiments were carried out by Mr. F G MaGuire, under Mr. S C Davidson's guidance and directions, and the resulting outcome is that now, at a small outlay to the tea garden proprietor, thorough control of the wither is, it is claimed, so perfectly obtainable that the quality of the tea produced is equal to that from leaf withered naturally under the most favourable circumstances of temperature and weather; and the time required for producing the wither is greatly reduced, so that the output capacity of the exsisting withering space is thereby increased to such an extent that in many instances large extensions to withering houses have been obviated.

A cold wither, it is stated, can now be obtained of such satisfactory quality that, if a small quantity of the leaf be pressed between the hands, it will stick together, showing that the leaf has attained that desirable soft and clammy condition which is so conducive towards the production of the best results during subsequent manufacture.

A large number of factories in Ceylon, ranging from sea-level to over 5,000 ft. elevation, have, we understand, been equipped with the necessary apparatus during the past season, and in actual practice, perfect withers have been obtained in twelve to fifteen hours, from leaf plucked on wet days during the rainy season, and which on arrival at the factory was saturated with rain water,

The opinions expressed by the proprietors and managers of the tea factories in which the new system (the principal item in which is the special adaptation of the new Sirocco fans in existing withering lofts) refer, we understand, in the highest terms to the results obtained.

Mr. F G MaGuire is now in this country, and will, we are informed shortly, visit London in the interest of Messrs. Davidson & Co., so that their numerous clients, representative of the important tea industry, will be enabled to gather further particulars from him as to this new system of withering The data and details of numerous trials which have been reported on various estates, where the entire crop of leaf is now being withered on this system, can, we learn, also be inspected.—*Home Colonial Mail* Jan. 11.

CINCHONA AND QUININE IN 1900.

The year 1899 ought to be a memorable one for quinine speculators, as the article has again proved a veritable will-o'-the-wisp. The makers have done their best to stem the tide of speculation by refusing to make contracts with speculators, but they have only been partially successful. At the first cinchona-auction in Amsterdam an average of 8·90c per unit was paid, but at the second one the price advanced to 10·65c, dropping to 10·05c at the third and rising to 10·10c at the fourth. From this period to the eighth auction in September there was an uninterrupted advance to 12·25c (the highest point touched). In November the unit dropped to 10·90c, and again this month to 8c. The gradual advance from 10·10 to 12·25c was due to a falling-off in bark-shipments from Java, but unexpectedly large shipments were made during September, October and November. There was then a deficiency of 1,100,000 Amsterdam pounds to make up before the year closes, of which 470,000 was wiped off in the first half of this month. Meanwhile the second-hand quinine-market has been influenced by every little wind that blew; but makers have been very passive, only raising their price when absolutely compelled, and at one period an advance of half-pence was made when quite two-pence had been expected. Prices are two-pence cheaper today than in January. The notable alterations by makers were a reduction of two pence in April and one of three pence in December. The highest figure of the year 1s 7d, in September, at which time the second-hand market stood at 1s 6⅜d spot—also the highest.—*Chemist and Druggist*, Dec. 29.

CINCHONA AND QUININE.

Recent events in the cinchona and quinine markets have rather upset the calculations of those who conceive and act upon short views of the course of these articles. With such an artificial and highly —in fact, one might say, fantastically—sensitive market as that created in London by speculative dealing, the natural trend of things is often obscured and even retarded for a period. It has been our good fortune to point to the promising positions of the market just before each occasion of late when advances have set in. These have not been so steady and consistent as natural causes acting alone would have made them. Speculators have paid the penalty for their weakness, or their rashness, or their miscalculations. Many of them have shown again their peculiarity of carefully keeping out of the market until it has sustained several material advances—then rushing in as if believing that quinine only wanted a start to carry it to goodness knows where. They never allowed for set-backs to compensate for the unnaturally rapid advances, and when some of them were involved in disaster the others had to pay a double penalty.

But to the men of long views the situation seems only temporarily clouded. They will find their ideas reflected in a letter from a planter which appears in the *Tropical Agriculturist*. Much of what this planter says reads like a re-echo of remarks in former notes of ours. For instance, he leads off by stating that nobody will deny that consumption of quinine has overtaken production. He continues as follows:—

"Nor is there any doubt that it will do so to a far, larger extent during the next five or six years, for that at the least, is the period necessary to bring matters to a state of fair balance again. The reason for this is evident; it takes five to six years under the most favourable circumstances to grow cinchona fit to bark."

Five or six years is the time we allowed for those planters to be ready with, new bark who had perceived the situation and had begun to extend their plantations in view of this. The planter whom we quote is bitter towards the quinine manufacturers who according to him, "have grown fat and sleek" by their manœuvring in the past, though "many cinchona planters have been ruined by it." He believes the move of raising the unit temporarily, in order to stimulate the shipments, is about played out, and he alludes to the low shipments from Java during the first nine months of 1900 to illustrate this. The Java planters, according to this correspondent, have now "probably learnt the lesson that a pound of bark at a two-penny unit is equal to three pounds at a penny unit as regards net results on every four per cent of bark." Turning from bark the planter has next some advice to give to quinine manufacturers. He says he is "one of those whose cinchona prospects have been ruined by the policy of the manufacturers;" yet he does not blame them for doing the best for themselves, but for the way they have done it. Now, he thinks their wisest policy is a generous one. This is to reduce their margin of profit to a minimum and thus by "a good and stable unit encourage the planting of as much cinchona as possible in the near future, and the cultivation of every cinchona tree in existence." It is, of course, impossible, he says, to tell what stock of quinine and bark they hold [all the evidence shows next to none, say we]. They have, however, to reckon on a steadily increasing demand, and "five to six years of decreased production." Any manœuvre tending towards a rapid overthrow of the unit would decrease the amount of cinchona which will otherwise be planted out in the near future. Even with an increase in the plantations, it is pointed out that much will not grow into anything worth barking, suitable land and good seed being difficult to find. Manufacturers are advised to investigate for themselves what is the state of the cinchona districts.—*B. and C. Druggist*, Jan. 4.

New Vegetables.—Were it not that humans are creatures of conventional habits, the probabilities are that our sources of food supply would be very extensive, and we should not be as dependent on certain known and cultivated species as we are. Arguing on this line of thought *La Science Française* puts forward the following suggestion:—"Our present garden vegetables are cultivated varieties of wild species; why do not our horticulturalists seek for other wild plants that could be introduced with profit to our tables? A fortune awaits him who does this successfully. We may be shy, at first, of a dish of iris, or a saxifrage salad, but the papers will relate how Bernhardt or Coquelin ate and liked them, and then the iris and the saxifrage will become popular, like the potato." The possibilities of the vegetable kingdom as a source of food supply are immense, and the suggestion thrown out above is well worth pondering over.—*Indian Gardening and Planting*, February 7th.

CINCHONA IN MYSORE.

The reader will probably smile at this headline, thinking that he is to see something after the style of the chapter on Snakes in Iceland, which read "There are no Snakes in Iceland." We have no such plagiarism in view, however, for there actually *is* cinchona in Mysore. That it is apparently not worth removing the bark from it is quite another matter. Official statistics show the following figures for 1898-99:—

		No. of Plants. Mature.	Immature.	lb of bark.
Kadur	C Succirubra	49,160	43,200	25
	,, var. Condaminia	9,840	4,500	
Mysore	C Succirubra	1,749	75	
	,, Calisaya	—		
	,, var. Condaminia	502	19	
Hassan	,, ,,	1,940	120	
		63,191	47,914	

In 1894-95 there were 350 acres under cinchona in Mysore, in 1898-99 only 279; in 1894-95 there were 207,783 cinchona plants in permanent plantations in Mysore, only 111,105 in 1898-99; the quantity of bark collected had decreased from 160 lb in the former year to 25 lb in the latter. Can any Mysore planter oblige us with a historiette of the Rise (?) and Fall of the Cinchona Industry in the Mysore State? The above figures suggest that there is something to be told that is worth the telling: 279 acres, 111,105 plants and yield—25 lb!—*Planting Opinion*, Jan. 26

A FARMER'S EVERY-DAY LIFE.

XVIII.

(*By Cosmopolite.*)

The New Year has begun with a dry change, for which we have long prayed:

THE WEATHER OF THE PAST YEAR

having been the wettest in North East Aberdeenshire, of all the years of the 19th Century, so, at least, says the oldest inhabitant and he ought to know; and now farmers, when they get the chance of a dry day, can't push fast enough in order to make up lee-way in the work which has been retarded by the bad weather. I have managed to get 300 loads of turnips carted, but it has been a terrible job, the mud up to the box of the cartwheels causing the work to be extra hard both on man and beast. My turnip crop has been an exceptionally fine one, and it gratifies me, when reading the reports of the prize competitions for the growing of turnips with artificial manures, to find that I have beaten the best record by a good deal, although I have only used bulky manure. The best record that I have read about has been

23 TONS PER ACRE

except in one instance when 28 tons were got from a field dressed with cattle manure only. Having sold a few acres of my turnips, as I had such a heavy crop that I was not likely to require them all myself, one of the purchasers, who had bought an acre, carted his to the railway station, where they were weighed and trucked South, and the aggregate was just a few pounds short of 30 tons, and this, I think, may safely be considered one more victory scored to the credit of bulky manure.

I see that many agriculturists are publishing complaints, in the press, about the habit which has been adopted, by the farm-servants, of drinking great

"BLASHES" OF TEA,

not only in the afternoon, but during the forenoon also. One writer, who farms in Peebles shire, tells how his ploughmen's children carry hot tea to their fathers, in the field, at 8-40 a.m., no matter what sort of weather is in evidence; and again, about 3 p.m., the same arrangement is carried out. He adds that he would not object to this during harvest time, or when work is from 6 to 6, but that surely it is uncalled for at the present time of year, when the work is only of seven hours' duration. This custom on the part of farm-servants has not yet reached our northern counties, so that I cannot speak from personal experience as to the effect which it produces on the men and on the work; but, no doubt, the habit, will be highly approved of by Ceylon tea-planters, as providing another outlet for the disposal of some more of their staple. Another singular habit obtains in England, which, I am thankful to say, has not yet reached Scotland, namely the

DYEING OF HAIR AMONGST THE LABOURING CLASSES.

The fact is that the working man has, long since, found that, if he looked old or white-haired, persons to whom he applied for a manual job would seldom entertain him if they could get a younger man. Even amongst clerks this habit prevails in a great measure, and some of these, of upwards of 60, are wonderfully made up. Writing on this theme reminds me of the rhyme of one's childhood.

"The sudden fright unnerved her quite,
She fainted dead away;
Her hair turned white in a single night,
But she turned it brown next day."

THE LONDON CHRISTMAS MARKET.

has been a complete frost this season, the price being very much under what the same class of stock was selling at, in provincial markets. This is easily accounted for, although, I fear, it will take many years yet before the dealers who patronize the London market will learn wisdom and become converts to the well-known fact that London is the city in which the *worst* meat in Britain is retailed. Formerly London was celebrated for its roast beef and Highland mutton but now, owing to the vast quantities of cheap foreign meat at their command, the London butchers do not care to buy the better quality and higher-priced article that Scotch feeders send them. Their customers grumble away at the tough meat they get, and for which they pay top price, but they make no attempt to improve matters, and it never seems to dawn upon them that they are steaks off the gully-rakers of Argentina, and frozen roasts off the working bullocks of Australia that they are eating.

It would be very different if these butchers were compelled to disclose the origin of the article they sell, and foreign meat be sold for what it really is.

THE BEST BEEF AND MUTTON

is now to be got at the small village butcher shops where the public see and take note of every animal that is slaughtered; where it came from, who bred it, how it was fed &c. And he would be a foolish butcher indeed who attempted to bring into one of our villages a frozen carcase or an animal bought at a distant market. The London Parish Council elected to do away with private

slaughter houses, so the butchers of the metropolis have gradually given up killing on their own account, but purchase their supplies from the freezing depots or the dead-meat market, hence the toughness and the poorness in quality of the meat retailed in the London shops. Now that the Christmas season is past, with its glutted markets and its low prices, I am preparing to send off my usual weekly consignments of sheep to the fat sales. When all the rest of the Agricultural world was flooding the markets with stock,

I HELD MY HAND,

and so, for the past few weeks, I have sent none forward for sale. The price is now going up, however, and as there appears to be a scarcity of stock owing to so much having been sent off at Christmas time, I hope that my patience may be rewarded by a good price. The season of ploughing matches has once more come round, but, as I referred to these entertainments in an early article, I will not again revert to what is undoubtedly of the greatest interest to our farm servants. Horses, with their coats shining like satin, are to be seen at work in every direction, the extra grooming which they are receiving being preparatory to the day when the man who looks after them, is to face the music on the ploughing match field. The harness also shines like enamel and the buckles glitter like silver, whilst the men put in their spare time in plaiting fancifully coloured ribbons into rosettes, with which to decorate their teams.

AN EXHIBITION OF PAINTINGS

was lately opened in our country town, and it has been acknowledged, by good judges, to be by far the best that Aberdeen has ever produced. A singular fact in connection therewith has been commented upon, and, as it refers in a measure to agriculture, I take notice of it. It appears that the best judges of art, the chief connoisseurs of paintings in the Silver City by the sea, are all, more or less, connected with inanimate farming produce. One is a wealthy soap manufacturer, which is made from the fat of stock; another is a felt-monger and tallow merchant, whose stock in trade is all derived from agriculture; another is a miller, whose grain, of course, also grows on farms, and, although he is dead now, the gentleman who did more for art in Aberdeen than any other, made a fortune in the granite trade, the quarry which he worked being on my own farm, and which is still in full swing. Granite, perhaps, can hardly be said to be the produce of a farm, but let that pass; with regard to the other three, however, there can be no doubt. I have never heard it said that agriculture tended to the making of an artist, but, who knows, I may, even at my time of life, break out as a modern Titian or a successor to Sir Frederick Leighton.

PARAGUAYAN TEA FOR WESTRALIA.—The secretary of the Westralian Department of Agriculture is making arrangements to try and cultivate the tree or shrub that produces Paraguayan tea. It has been cultivated successfully in the Botanical Gardens, Melbourne, and it is considered that it should find a suitable home in many parts of Westralia, especially in the north-west and south-west divisions.

THE DEVELOPMENT OF THE TEA TRADE.

We quote the following from Harrison's and Crosfield's Tea market report,—the local branch of the firm being Crosfield, Lampard & Co., Colombo,—dated 3, Great Tower Street, London, E.C., 7th January, 1901:—

The Statistics just published having closed a Century of remarkable expansion in the consumption of Tea in the United Kingdom, it may not be altogether uninteresting to note the various developments in the Trade, together with the changes in the Duty, market value &c., as they have taken place from time to time. At the beginning of the Century the entire Import of Tea was in the hands of the East India Company; and the Duty was collected through them, by an *ad valorem* percentage on the prices realised in their Public Sales. The monopoly granted in their charter having come to an end in 1833, this method of levying the Duty was no longer found practicable, so a specific rate per pound was adopted instead, and it has continued to be so levied ever since with the undernoted variations in the amount.

Table showing the quantity of Tea consumed in the United Kingdom at the various points in the 19th Century when changes of Duty were made: and the quantities of Indian and Ceylon Teas consumed after their introduction.

Year.	Duty.		Av'rage market value without duty.		Total home consumption.	Indian.	Ceylon.	China and other sorts.	Percentage of British grown Tea.	Percentage of Foreign grown.
					millions			lb. entire		
	s.	d.	s.	d.	lb.	lb.	lb.	supply		
1800*a*	1	2½	3	0½	23	—	—	do	—	100
1801*a*	1	6	3	0	24	—	—	do	—	do
1803*a*	2	8	2	10¾	25	—	—	do	—	do
1806*a*	3	2	3	3	22	—	—	do	—	do
1811*a*	3	3	3	4	22	—	—	do	—	do
1815*a*	3	1	3	2	26	—	—	do	—	do
1819*a*	2	9¾	2	9¾	25	—	—	do	—	do
1828*a*	2	6¼	2	6¼	29	—	—	do	—	do
1830*a*	2	3¼	2	3¼	30	—	—	do	—	do
1833*b*	2	2	2	2	32	—	—	do	—	do
1836	2	1	1	7	49	—	—	do	—	do
1840	2	2¼	2	7¼	32	—	—	do	—	do
1850	2	2¼	1	3¼	51	—	—	do	—	do
1853	1	10	1	3¼	59	—	—	do	—	do
						million		millions		
1854	1	6	1	3½	62	½	—	61½	1	99
1855*c*	1	9	1	3	63	½	—	62½	1	99
1857	1	5	1	5½	69	2	—	67	3	97
1863	1	0	1	6¾	85	3	—	82	3½	96½
1865		6	1	8	97	3	—	94	3	97
1870		,,	1	5¼	117	13	—	114	11	87
							million			
1875		,,	1	4¾	145	25	⅛th	120	18	82
1880		,,	1	1½	158	45	⅛th	113	28	72
1883		,,	1	0½	171	59	2	110	35	65
1885		,,	1	0	182	64	4	114	38	62
1890		4		10¾	194	100	36	58	70	30
1895		,,		9¾	222	111	71	40	82	18
1900		6		7½	249	137	94	18	93	7

a Duty assessed by percentage on value.

b East India Company's Monopoly abolished.

c Crimean War Budget.

THE POTATO INDUSTRY IN KUMAON.

The last monsoon of this century must be set down as a rascally bad one for this important crop of the province of Kumaon. I do not remember a more highly promising spring than the last during the past dozen years; the weather was ideal and could not have been better made even in Germany up to the month of May. But after that date and all through the month of June what rainfall there was —and it was very little save in places—came in non-effective driblets, and so progressed the monsoon period until the 11th of July when it did rain in real earnest, but the destructive drought had done its work: and in fifteen days after the real rains had set in it was quickly seen the potato plant had had enough and would do no more in the way of plant-production. Meantime the weather continued exceptionally warm and vapoury, and the great development of the rainfall was not as usual in July but near the tail end of the monsoon. In consequence of the altogether premature closing of plant growth three things ensued. First, there is this year a great dearth of large potatoes compared with normal years. Secondly, there is an excess of small potatoes; but thirdly, and worst of all, potatoes have supertuberated badly—indeed I have never seen this evil so pronounced.

Few people probably out of the province are fully aware of the amount of excitement, speculation, and finesse the native growers impart to the trade of growing and dealing in potatoes. For example one would think the best possible thing for a potato after digging it up was to dry and clean it, to separate bad from good, large from small, and so forth, and so it is in reality. But the native growers do nothing of the kind, but this is what they do. They remove about a foot deep of earth in circular form, the size being ruled by the amount of potatoes to go into this base for a conical pile of potatoes, which may, and does, vary from 5 to 100 maunds. Soon after digging up the potatoes go into these conical heaps, all the sorting being for the veriest mites that grow; these are saved for seed. Now at digging up time it is usually brilliantly fine by day, the sun is hot, and the potatoes damp as they go into the heaps; the moment these are completed a layer of grass is put round them and on goes a pile of earth an inch or two thick. There are here all the elements for keeping the tubers very thoroughly moist, drawing moisture up from the earth in fact, besides that with the potatoes already. The dealers buy from these heaps. The potatoes are lifted and weighed with extraordinary rapidity and a desperate kind of earnestness, dirt, small stones, bad and good, and all finding their way into the dealer's sacks with despatch. The dealer says but little besides seeing he gets weight, but he is, however, far from the apparent fool a casual observer might take him to be. When the weighment is over, he draws out a coil of rupees from somewhere and deals out so many: but the settlement day is at Haldwani, as many a grower knows full well.

The native grower is devoid of any consuming kind of honesty in growing potatoes. I have mentioned that this year potatoes have supertuberated badly: which is to say the crop in large measure, particularly the late-dug-up potatoes, grew again or commenced to grow. Now the effect of this is practically to spoil the tubers for table use, and also to produce seed which when planted shows much irregularity, some coming strong, others weak, and yet a lot more very much behind the rest in growth. The growers however lump them all in and say not a word to the buyers of such a fact. This year, however, there is heart-burning among the wily growers, for the Bengali dealers have come along with a terrible tell-tale weapon none other than a homely knife. With this they slice up samples of potatoes longitudinally; in a very few minutes, your supertuberated tubers tell their own destrution, being either of a congealed watery consistency, or with black markings, in eithor case they are inedible.

The buyer wants potatoes, the seller wants money, but the advantage is with the buyer, because he has grown more astute than in former years when he purchased direct from the field, whereas now he buys at Haldwani, knowing full well once the potatoes are there none but a madman, and scarcely he even, will take them back again: and so he seizes the bad samples, forthwith quoting terms, which are this year anything but magnificent. I greatly fear Kumaon potatoes will come in for a bad name this year; it is certain many hundreds of maunds are bad—very bad. But I hasten to say it is an entire mistake for any one to assume, and I happen to know some have assumed, that it is the disease. The evil is supertuberation, induced first by the extreme lateness of the monsoon, and its long continuation beyond the usual period. This is quite sufficient to turn many potatoes either black inside, or hard and stony. I believe a normal season will establish the fact that the province is practically if not entirely, free from the dreaded disease known in other parts of India and all over Europe.

I endeavoured to persuade many growers to hurry on with digging up, and mind nothing else for the time being, and pointed out that the late-dug potatoes would be very inferior, but the native will have none of these ideas; he is waiting, watching the Haldwani market, keeping a man there indeed to scent the fluctuation. This year he is being pretty well punished and it serves him right. Two years in succession previous to this the Haldwani market floundered about between R3 and R6 per maund, due in a large measure to astute speculation, and practically false information, for which the dealers were made to pay through the nose; the growers reaped a fine advantage; but the middleman as usual the best of all.

There is no doubt whatever at the present time the Kumaon patatoes for seed purposes are of very material advantage to practically the whole of India. The native with his extraordinarliy cheap way of working the crop makes incomparably the best profits out of potatoes, and for this very reason there is a growing evil which it is earnestly to be hoped Government will once for all put down, particularly at this opportune moment of settlement operations. I refer to the monied speculators—they have become monied solely through this crop. They are in every place where potatoes are grown, and generally absolute strangers. These men are the wire-pullers, always prompting a dummy to put in applications for land: and promptly stepping in afterwards. Now my contention is no man has a natural right to land in this way, entirely out of his own *puttie*, and removed from his own village and home. There is a rule in the province now that no man can acquire lands without property qualifications: and I am sure there is no rule that has been during the past seven to ten years more technically observed, but virtually and in reality more absolutely broken. What is required is to kill the speculative part of this trade, and for Government to fully recognise that it requires steady progress and uniformity of grants for potatoes, every man to be limited to his own capacity for production of this crop, and to his own *puttie*, and no bunniahs to receive grants at all. I should suppose 2,000 or 3,000 acres during the past 10 years have been exploited by people who had precious little right to the land since they have done nothing to cultivate it, but brought in the outsiders from distant *putties*. Potatoes are the sum and substance of matter to him. Lest it should be supposed I have some animus against bunniahs I may be allowed to quote a true example seven or eight years ago. A bunniah came from somewhere, not in the immediate district, and obtained a small piece of land for which he paid Government the magnificent sum of R5 per annum. It was to my certain knowledge and direct personal observation, as jungle, one of the finest pieces in the *puttie*. The way that insigni-

ficant beginning grew into a considerable piece many times larger than the original was a marvel. In addition this same man obtained another piece, stuck up a bunniah's shop where one was absolutely not required at all, and thereby annexed a piece of resting land for ponies and Bootias. Further, he hacked the jungle in the barbarous jhooming fashion right up to the Government Road, in flat contravention of another rule about jungle adjacent to Government roads. Yet again this same man in conjunction with another put in application for yet a third piece of land, but the officer before whom it came was one too many for him He has since died, having made a heap of money: since which Government, I believe, has resumed the original grant The wisdom of this sort of thing seems to me conspicuous by its absence. NICOTIANA.
—*Pioneer.*, Jan. 17.

PLANTING ON THE ANNAMALAI HILLS.

(*From a Correspondent.*)

I have on one or two previous occasions given an account of planting progress on the Annamalai Hills, Coimbatore District, and a further report may be interesting. Over 2,000 acres have now been opened, about 1,000 of this being

COFFEE

the growth of which is quite satisfactory. I have picked about 1½ tons of crop from plants, a few hundred of which were put out very late in 1897, the balance in 1898; and at the present time not only all the 1898, but a large proportion of the 1899, planting has a large, even spike, promising a fine blossom after the next rain. Quality of bean looks excellent, and I am having the above small lot cured and shipped. If coffee is to keep down in price (it is useless going into the pros and cons of such a question here) good quality means salvation, and I am trying both the Maragogipe and Costa Rica coffee to get a fine bean; but from experience of various districts I am convinced that however useful careful selection and cultivation are, the natural conditions of soil and climate are mainly responsible for quality. No manuring has been done as yet, but 150 acres of the clearing are being trenched at present. It is worth mentioning that there has been no failure of the S. W. Monsoon during the recent dry years.

CARDAMOM

clearings are doing very well; and though a wary and somewhat pessimistic old planter, who was going round mine a few day ago, remarked that "good growth was all very well, but no doubt cardamoms would be selling at a penny a lb. in a couple of years," it is not an expensive cultivation, and if there must be a survival of the fittest such a natural home of the plant should be amongst the survivals. It must not be forgotten that there is a large market in India for this product, so large that the local price is not dominated by European rates, and the producer therefore does not suffer from the crushing effect which the 1s 4d rupee has on the coffee and tea grower. Over 1,000 acres in all have been opened in cardamoms up to date. Mysore seed has been tried, not all ways with success. I do not know whether it is unusual, but I notice that the short plump Mysore or Ceylon cardamom, and also the long Malabar fruit, are picked from indigenous plants growing side by side, and, I think, off the same plants, but this latter I cannot be sure of as yet. The partial clearing necessary for cardamoms costs us 15 to 18 rupees per acre.

TEA,

2½ years old, covers the ground well. I am not making tea from the few acres which I planted, more to see how it grew and to encourage others than for any other purpose, so the bushes, though they have been cut down, are some eight feet high or so. A planting at stake, on another property, is, I am told, coming on well, and from the great rapidity with which my plants grow and spread I can quite believe that the Annamalai tea-planter will be among the survivals, if quality can be obtained.

CINCHONA

I am very pleased with. Last year I planted C. Ledgeriana, believing that we had just the right conditions to suit this valuable but delicate variety. The plants were very small, too small in fact to put out at all until August and September, 1900, but there are many 15 ins. high now, and their healthy appearance is all that can be desired. A large amount of this variety, from the best Java seed, will be planted this year, the very free, deep soil, with its splendid drainage, appearing to suit to perfection. Some neighbours are giving Succirubra and Hybrid a trial, thinking that Cinchonidine and quantity of bark will yet pay. Personally, if, as seems probable, we eventually settle down to a penny unit, I pin my faith to good class Ledger, as, if it grows as well as it now promises, we shall have no difficulty in holding our own against the Java average of 5¼ per cent S Q. or even the Java Government average of 7·16 per cent. With cinchona also it is very marked how thoroughly suitable conditions tell on the quality of the bark and send up the analysis.

PEPPER,

according to my experience, does not do well, possibly, as has been suggested, because the elevation 3,600', is rather too great, and our evergreen forest climate is not forcing enough.

HEVEA BRAZILIENSIS

is making what I am told is excellent growth, but I know little about Para. I should have thought the elevation too great. Work on the ghaut road has gone on steadily, and we hope this will be completed to the nearer estates in the course of the year. Labour has presented no greater difficulty than in other districts, and the jungle tribe of Kaders has quite taken to long periods of steady work on the estates. Health generally has been excellent. On the whole, in spite of the general depression among planters, I feel sure that the youngest planting district will be by no means last in the race.—*Madras Mail*, Feb. 7.

COFFEE PRODUCTION IN MADAGASCAR.

Recent reports by the French Bureau of Foregn ommerce contains statistics relating to the tea and coffee industry of the Protectorates of Annam and Madagascar. The production of coffee in the eastern coast of Madagasoar isexpected to deveolp soon into important proportions. In the past it has been insignificant, but the French Government has published figures showing that in a short time an estimated crop of 718,000 kilogrammes (1,568,000 pounds) may be looked for. The receipts of coffee from all the French colonies in 1889 were only 963,000 kilogrammes 2,118,000 pounds. —From *Journal of the Society of Arts*, Dec, 28, 1900.

TEA IN FRANCE.

CEYLON AND INDIAN VERSUS ANNAM.

A recent report by the French Bureau of Foreign Commerce contains statistics relating to the tea ndustry of the Protectorate of Annam. The year 1894 was the first in which tea from one of her colonies was offered in France. In that year 7,500 lb were received from Annam. In 1896 the receipts increased to 10,296 lb ; in 1897 to 13 000 lb. In 1898 the imports of tea from Annam into France were 42,262 lb. The figures for 1899 are not yet available, but it is estimated that the exports will not be less than 54,000 lbs. Up to 1892 Annam tea was cultivated only for use among the natives, and the proposition to cultivate it for European consumption seemed a chimera. But the consumption of tea in France was increasing very rapidly. From 1,447,635 lbs, consumed in 1892, the quantity rose to 1,794,832 lbs in 1898, and increased by nearly another 100,000 lb in 1899. The supply was almost entirely from China an Ceylon. The tea from Annam is said to equal the finest article produced in China. It is in very general use in the French army in Annam, and it is only believed to be a question of time when it will meet the entire demand in France. The production is daily increasing. The old colonists are going into the business of growing tea, finding it more profitable than any other occupation. The above statements, culled from a French report, are not very favourable as to the prospects of Indian and Ceylon tea in France. They must, however, be accepted with a considerable "pinch of salt," as it is highly improbable that Annam tea will ever be able to compete with the British-grown product. It is hoped that the standard of tea will be raised in France and that the Ceylon staple will be supplied to the army. Strenuous efforts are being put forward to achieve these most desirable results.—*I. P. G.* Jan. 19.

OVER-SUPPLY—LOW PRICES.

[To the Editor, *Home and Colonial Mail.*]

Sir,—There is no doubt that the advance of 2d per lb. in the duty was imposed in a most inopportune year for the producers of tea. Even though the duty had not been increased, we should doubtless have had a fall in values due to over-supply, but this fall has been aggravated by curtailment of demand, owing to fictitious or forced increase in the retail or consuming price of the article. The planter is thus smitten on both cheeks. What is the remedy? There is only one: reduction of supplies.

There are various schemes suggested, having this object in view, some more absurd than others. One goes so far as to propose burning or destroying a portion of the tea. To these various suggestions let us add one more. It is this: that every producer should agree, under penalty, to allow 10 per cent of the total area of his estate to remain unpruned and untouched for one year. The area lying fallow would unquestionably be improved by the year's rest, and if the scheme were workable and succeeded, then that particular 10 per cent of acreage could be cultivated the next year, and another 10 per cent could then be given a well earned rest. The effect should be about 10 per cent less tea, which might mean an advance in London in price of perhaps 1d or 2d per lb., or say, roughly, 20 per cent.

We like to make practical suggestions, but as we think insurmountable difficulties might crop up which would make this suggestion impracticable, we desire to subscribe ourselves.—Yours truly, BROKERS.

London, January 3, 1091.

PLANTING NOTES.

GOOD PRICES: A HINT TO THE TEA FOLK.—We are interested to learn from Mr. Geo. Christie that the estate, Kanapediwatte, of which he has charge, sold 2,947 lb. cinchona bark in November last, and that it fetched 47¼ cents per lb. in Colombo. Better than Orange Pekoe?

Elephants in N. Siam.—Elephants have grown so scarce in northern Siam that a special law has just been passed for their preservation. Any person wrongfully killing an elephant is made liable to fine or imprisonment. Formal permission to catch an elephant must be obtained from the authorities, and one in five of those so caught will be the property of the Government.—*B. Gazette*, Nov. 21.

Treatment of Mosquito Bites.—M. Manquat recommends, for the treatment of the bite of the mosquito usually met with in France, the employment of tincture of iodine, formol, or mentholised eau de Cologne. Applying the tincture of iodine on a brush causes the disappearance of the itching at the end of about ten to twenty minutes. Although the iodine acts much more quickly when it is applied at once, still it does not lose its efficacy when the papules are enveloped and inflamed. Using formal, five grammes are taken of a forty per cent solution, and mixed with ten grammes of ninety per cent alcohol and ten grammes of water. This is applied in a thin coat and renewed as it evaporates, care being taken to discontinue on the appearance of any cauterising effect. This is said to act even more quickly than the iodine mentholised eau de Cologne, or mentholised alcohol of a four or five per cent solution, also soothes the itching.—*British and Colonial Druggist*, Jan. 25.

Extraction of Rubber.—A novel process was described recently before the Society of Civil Engineers of France for the extraction of india-rubber from the tree. The bark and roots are cut up and soaked in dilute sulphuric acid. The effect of this is to decompose the woody portions without affecting the india-rubber. In this way a division is made between the valuable rubber and the rest of the bark and roots, and it is claimed that the rubber so produced is quite pure. It was stated by the author that 1 lb. of india-rubber could be produced by the process at a cost of about 2½d.—*Engineer.*—Two French chemists have discovered a process by which rubber may be obtained from Landolfia vine, which grows wild and luxuriantly in all parts of Africa The process of tapping the Landolfia is impracticable, as the flow of rubber hardens too quickly. By the process of M. M. Arnand and Verneuil, the vine is crushed in hot water, by which means all the rubber which it contains is extracted. —*Queensland Agricultural Journal*,

Correspondence.

To the Editor.

TEA PROSPECTS AND OVER-PRODUCTION.

DEAR SIR,—It is only natural that current rates for low-priced tea should cause producers in India and Ceylon some alarm, and, as many enquiries have reached me regarding the reason for, and probable duration of, the present state of things, I should be obliged if you could find space in your valuable paper for this letter which may interest some of your readers and, at the same time, be a reply to all my correspondents.

The usual London statistics being merely rough estimates based on a supposed average nett weight, I have obtained the official figures from the Board of Trade returns, and they show that notwithstanding the increase of 2d per lb in the Duty, the actual consumption of Indian tea in the United Kingdom during 1900 showed an increase of 4,006,105 lb and of Ceylon tea an increase of 7,332,063 lb or a total of 11,338,168 lb (whilst China tea shewed a decline of 4,106,895 lb) and the export also shows a moderate increase of 2,548,002 lb Indian and 1,631,026 lb Ceylon; so that London practically disposed of a total of 15½ millions out of the 21¼ millions increased shipments from India and Ceylon. These figures, in my opinion, should at once remove any serious cause of alarm; the expanding consumption of the article disclosed by the figures of the Board of Trade being an unanswerable argument as to the inherent soundness of the industry. The extremely high prices ruling for common tea during the latter part of 1898 and the commencement of 1899 induced most gardens to go in for making the maximum quantity at the minimum cost, and of the lowest quality. Helped by an abnormally favourable season and also, to some extent, by the aid of manure, the result has been an increased shipment from Ceylon to the United Kingdom during 1900 of 10,850,000 lb, and from India 10,397,000 lb totalling 21,247,000 lb, thus leaving a very distinct surplus over and above the increased consumption: and this surplus is made up entirely of common tea, which is demonstrated by the satisfactory rates ruling throughout the year for all teas with any pretensions to quality. The theory advanced by some that a large quantity of the tea exported from Ceylon and India this year is too common to be consumed readily may be dismissed; for in 1898, teas which today are difficult to realize at from 3d to 4d per lb were readily taken by the trade at from 6d to 7d; and were the position today the same as in 1898 the same rates would be obtainable. The position, however, is altered. Instead of a scarcity of common tea every market is glutted with it; and as the addition of 2d per lb to the English Duty has resulted in the practical abolition of all the retail canisters under 1s 4d—for which canister competition forces the trade to pay from 6d to 7d per lb. The consequence is that the best value offering at about that range finds a ready market, whereas anything distinctly inferior is almost entirely neglected, its chief outlet being for export.

The duration of present prices rests entirely with planters, and will continue as long as the policy of flooding the English market is persisted in, only more so. Many suggestions have been made to rectify the present state of things, the most remarkable being that 10 per cent of the land under cultivation should be abandoned. This does not, I imagine, come within the range of practical politics, nor, in my opinion, is it necessary. By combination in both Ceylon and India, in three months a totally different range of prices for common tea could be established. Are the Associations in Ceylon and India sufficiently strong to bring this about? An agreement universally to adopt fine plucking for the period stated would have an immediate effect, if it were known in London that it would be rigidly adhered to.

To deal, however, with the output of the increased area under cultivation (which, in both Ceylon and India is as yet not in bearing or only partially so) the further development of the markets in Colombo and Calcutta is essential. Not only should more teas of all descriptions be offered locally, but steps should be taken to make conditions for buyers in the Eastern markets as favourable as those in force in London. All teas offered in Colombo and Calcutta should be more carefully bulked on the estates and more carefully graded and packed even than those shipped to London. The object in selling locally is to develop a foreign trade, where uniformity of leaf, freedom from dust, and good packing are all points of the greatest importance. At present, while care is taken in the bulking and packing, &c., of teas destined for direct shipment to London, this care by many estates is considered unnecessary in teas intended for local sale. As a matter of fact it is more important that care should be exercised there; for in foreign markets we meet in competition China and Japan teas, which, as regards packing, freedom from dust, and uniformity of leaf, are immensely superior to Indian or Ceylon teas.

The chief aim of India and Ceylon should be to avoid sending to England more than she requires; for to do so means lowering the price of British-grown tea throughout the world. London is still the barometer of the world, as far as British-grown tea is concerned, with the exception of Australia; lower that barometer by oversupplying her market, and prices drop all round. Far wiser, in need, to sell a few millions cheap in Calcutta and Colombo and so encourage the development of a foreign trade than send to London a few millions over her visible requirements, which means reducing the price generally on an immense quantity of tea. There are many interests which tend to draw tea to London, but the price obtainable is not always one of them. If, however, the policy of flooding the ruling and most important market of the world is continued, no material alteration or improvement can be looked for until consumption again overtakes production. Apologising for trespassing at such length upon your space.—I remain, yours truly,

ARTHUR LAMPARD.

CACAO

POLLINATION AND 10 CWT PER ACRE.

DEAR SIR,—Mr. Carruthers, among other things, I believe, is devoting his attention to pollination of cacao flowers, and I have ventured to collect a few ideas on the subject.

If only a tenth of the female flowers that annually appear on a cacao-tree set, 10cwt per acre would be common. But there are dangers

ahead, and in our endeavours to avoid Scylla it would be well at the same time to have a care of Charybdis.

Thus a tree bearing at the rate of 5 cwt per acre—and this is surely a low estimate in the event of successful pollination—should yield about 50 average-sized pods per annum. But this is reckoning 300 trees per acre.

It is not probable that the average Ceylon soil will stand the drain of 5 cwt per acre for very long, therefore systematic manuring is bound to be more or less generally adopted, sooner or later. Nor can it be expected, however much it may be hoped, that so delicate a plant, as the chocolate tree has proved itself to be, will absorb and continue healthfully to assimilate the concentrated nourishment of impoverished soil highly impregnated with stimulants. Moreover, the best artificial manure for cacao has yet to be named.

Ceylon planters have only to look about them to be fully assured of the fact that 20 to 25 years at a remunerative rate of yield, say 3 cwt. per acre, and a hundred trees for every hundredweight, should be the outside life-limit of the cacao-tree. It is useless to point to individual trees, whose locality is an open secret, whose age may be stated at 30 or 40 years, and whose fecundity is astonishing. The comparison fails (1) because the individual tree in question is not one of a number of others planted at say, 12 feet by 12 feet; (2) because cacao so planted will have been treated far more drastically than the solitary tree which bears so munificently; and (3) because, in the case of Forestero (to which these points more especially apply), there is not in the whole island a field of any useful extent planted up with only one particular variety. Such trees are altogether exceptional. So that every 20 to 25 years the estate will need to be renewed. For canker will help.

Now, the lower a tree, the cheaper the crop-gathering; therefore suckering will continue in vogue. But the tree having been heavily manured there will be an abundance of "suckers," and this means extra expense. But as the tree will achieve a great spread, this need not be taken into consideration, for then 300 trees per acre will become an impossibility. Probably 150 trees per acre would be nearer the mark.

In order to obtain 5 cwts. per acre from 150 trees, each tree will need to bear 100 pods, and there will probably be no decrease in the expense of manure. Being set further apart the trees are likely to live longer, however; and this is already a big step in the right direction.

To qualify this I am personally acquainted (and concerned) with fields of Forestero cacao whose trees have an average perimeter of 25 ft., and they are not yet at their maximum. Let me, therefore, suggest that their maximum spread will be 30 feet—a low estimate—say, therefore, 50 trees per acre. This indicates that in order to obtain 5 cwts. per acre, each and every tree must bear on an average of *300 pods per annum.*

But a tree with a perimeter of 25 ft. must of neccessity be some 15 ft. to 20 ft. in height, and probably much more. The *cost* of pollinating, an expensive process at best, now becomes something that may be felt. Picking will be dearer, for the trees will be very tall. Moreover, the cost of seed, and the planting of it is not excessive, so not much will be *saved* by having fewer trees per acre.

Trees planted at 25 ft. will find some difficulty at first in covering the ground; therefore weeding will become of more consideration than usual. In order to avoid this, the cacao might be planted at 12 ft. or 15 ft. and alternate trees cut out later. It is doubtful whether the crop for a year or two will make up for the trees so cut out. There might be two lean years.

Finally, cocoa will drop to 15s per cwt, through overproduction!

Now, the first answer to all this is that there already exist in the Island fields—few indeed!—which give, or recently gave, up to 8 cwt. per acre. But this does not dispose of what may be condemned as a *reductio ad absurdum.* for such fields are of the red variety of which planters are becoming more and more shy. Moreover, any attempt at pollination in such fields would be justified only if the owner were willing and prepared to cut out and replant every 15 to 20 years. Under such circumstances (8 cwt. per acre) even the greediest planter would be inclined, I surmise, to leave well alone.

Manifestly, then, there is a point at which pollination, as fertile as I assume, and apart from the physical capacity of a tree to produce flowers which might set, must cease in order, paradoxically, to become beneficial. So that pollination is to be welcomed more in respect of that cacao which is not giving more than two or three cwt. per acre; otherwise the trees will become worn out in a very few years.

Some may say "What though they do become worn? The younger the trees, the larger the pods (the less, therefore, to the cwt.), and the older the trees the more liable they become to canker. Let us plant up afresh two to three years—(and with *grafted* cocoa it is hoped this will be possible)—before we cut out every 20 years, so long as we get our 10 cwt. per acre." Once recognise the fact that the life of a cacao-tree as at present cultivated is as stated, and the answer is obvious.

But if it were possible to obtain eight to ten cwt. per acre without cutting down—if, by means of pollination, a sixth of the trees per acre of a virile and prolific variety of Forestero could be made to bear as well as a Criollo field at 300 trees per acre, can there be any choice as to which of the two methods is to be recommended?

But as there is no field in the island of only one variety of Forestero, so there is no field of Forastero in the Island which gives—I speak under correction—more than two to three cwt. per acre; and on the top of this comes pollination.

But is there any known jât of cacao—Criollo, Forestero or Calabacillo—which can be depended on for 300 pods per tree per acre per annum?

For purposes of argument I propose to halve this figure: $2\frac{1}{2}$ to 3 cwt. per acre show a very decent profit. There are Forestero fields giving that now, and successful pollination should double and treble this yield.

And the second answer is that cacao, like everything else, is worth precisely what it will fetch in the market. *Verb sap.* POD.

"SILK-WORM SEED" FROM CONSTANTINOPLE.

Colombo, Feb. 11.

DEAR SIR,—I send you herewith for inspection a sample-box of silk-worm "seed," reared in Constantinople, in which, the sender

says, "a large export trade is done, considerable quantities being sent to Kashmir and other parts of India." I should wish to know if you or any of your readers have any experience of the process of "rearing," and if it is done to any extent in this island. I have received also a pamphlet in Turkish explaining how the silk-worms are to be reared from the eggs or seed; but as the language is not familiar here, it will be useless to give extracts.—Yours faithfully,

M. L. M. ZAINU DEEN.

[For a concise account of what has hitherto been done in "silk" experiments in Ceylon, see page 129 of our review in last "Handbook and Directory." The Northern Province is expected to be best suited for the silk-worm and mulberry tree, being so dry. Major Gordon Reeves of Madulkele and Father Palla of the R. C. Mission, Galle, were amongst the most recent experimentalists, and they might be glad to have some of the "seed." We add the following information for the benefit of our correspondent :—

The eggs of the silkworm, called *graine* (seed) are hatched out by artificial heat at the period when the mulberry leaves are ready for the feeding of the larvæ. These eggs are very minute—about one hundred weighing a grain; and a vast number of hatched worms may at first be kept in a small space; but the rapid growth and voracious appetite of the caterpillars demand quickly increasing and ample space. Pieces of paper punctured with small holes are placed over the trays in which the hatching goes on; and the worms, immediately they burst their shells, creep through these openings to the light, and thereby scrape off any fragments of shell which, adhering to their skin, would kill them by construction. The rearing-house in which the worms are fed (Fr. *magnanerie*) must be a spacious, well-lighted, and well-ventilated apartment, in which scrupulous cleanliness and sweetness of air are essential, and in which the temperature may to a certain extent be under control. The worms are more hardy than is commonly supposed, and endure variations of temperature from 62° to 78° F without any injury; the higher temperature is very detrimental. The lower the temperature at which the worms are maintained the slower is their growth and development; but their health and vigour are increased, and the cocoon they spin is proportionately bigger. The worms increase in size with astonishing rapidity, and no less remarkable is their growing voracity. Certain races moult or cast their skin three times during their larval existence, but for the most part the silkworm moults four times—about the sixth, tenth, fifteenth, and twenty-third days after hatching. As these moulting periods approach, the worms lose their appetite and cease eating, and at each period of change they are left undisturbed and free from noise. The worms from 1 oz. of graine—numbering, say, 40,000—consume in their first stage about 6 lb. of picked leaf, in the second 18 lb., in the third 60 lb., in the fourth 180 lb., and in their final stage 1,098 lb.,—in all 1,362 lb., of mulberry leaf; but from that is to be deducted about 590 lb. of unconsumed fragments removed in the litter, giving of leaf really consumed 772 lb. An ounce of graine so treated may yield from 80 to 120 lb. of cocoons, 85 per cent. of which consists of the weight of chrysalides and 15 per cent. of pure cocoon.
—ED. *T.A.*]

KURUNEGALA, Feb. 18.—The weather is hot and dry. We had some most welcome rain on Saturday night—the showers were heavy and lasted some time. Sunday evening looked threatening, but no rain fell. The mornings are misty, prognosticating a sultry day.

PRODUCE AND PLANTING.

IMPORTANT TO MANUFACTURERS OF SUGAR MACHINERY. British Central Africa will soon occupy a prominent position as a sugar-producing country. In the rich, fertile district around the Lower Zambesi and the Shiré rivers the sugar industry already promises to become very important within the next few years. One company alone has 1,100 acres under cultivation at the present time, and shortly intends to bring in a further tract of 2,500 acres, while several other companies and private planters are either making preparations for planting sugar or have already started plantations. The land "according to reports recently to hand," is highly suited to the growth of sugar-cane, and there seems to be an ample supply of labour, while the sugar grown is said to be superior to that from Egypt. Sugar-cane growing is an industry, moreover, that gives a good return for a comparatively small outlay of capital, and, with the experience gained in Natal, the district round Chinde "should speedily become one of the great cane-sugar-producing centres of the world." A hope is expressed that British manufacturers of machinery and agricultural implements will not fail to grasp the opportunity which presents itself. As the country is staked out and divided up into plantations the demand for tools and implements will steadily increase, and as the canes grow mills for crushing and refining will become necessary.

RICE-CLEANING MACHINERY.—The British Commercial Agent in Russia has received an inquiry from Samarkand (Turkestan) asking for names of British firms supplying rice-cleaning machinery of newest type of construction, and, if possible, such as have received prizes and awards at the Paris Exhibition. The catalogues would probably be more serviceable if well illustrated, and it would be of advantage if the technical descriptions were in the Russian or German language. Further information may be obtained from Mr. Henry Cooke, British Commercial Agent, 88, Petrovski Bouleward, Moscow, to whom all communications should be addressed.

THE ZANZIBAR CLOVE TRADE.—The "1899" crop of Zanzibar cloves was the heaviest on record, and was 570,600 frazils, or 7,061,250 lb above that in the previous year; but whether this excessive outturn will be equalled in the future is a question which is beginning to exercise the minds of the trade generally. No reliable estimates of the total crops for 1900 have yet been published, and it is doubtful if the yield of cloves for the coming season will again be of similarly large dimensions. The grounds for entertaining this supposition are that circumstances in connection with the systematic cultivation of cloves in Zanzibar have considerably altered within the last few years, it being no longer carried on by compulsory slave labour as formerly, and time has not been afforded the planters to recover from the disastrous effects of the severe drought that existed during 1899-1900. Since the importation of slaves was prohibited, and the blacks were granted their freedom in 1897, the scarcity of labour in Zanzibar has been keenly felt. Prospects of a continued abundance of Zanzibar cloves are, therefore, not particularly cheerful, and as this condiment is in universal demand, any serious diminution in supplies would have an instantaneous effect in forcing prices up to a higher point. Speculators have already been busy enough to send quotations in Mincing Lane up to 4¼d and 4½d, which is 1d per lb beyond what was paid on the spot in January last, and judging from the extensive purchases of Zanzibar cloves to arrive, made from time to time, it is reasonable to anticipate a further improvement in value as the season advances.—*Home and Colonial Mail*, Jan. 25.

OUR PEARL-OYSTER FISHERIES AND MR. SAVILLE-KENT.

Last mail brings us a letter from Mr. Saville-Kent in which he states that he sent in his application to the Colonial Office for the appointment to investigate our Pearl Oyster Fisheries, backed by a strong testimonial in his favour from Lord Avebury (Sir John Lubbock); but Mr. Saville-Kent feared he was too late, though he understood the steps to be taken with regard to our Fisheries had not been finally determined on. Mr. Saville-Kent adds:—

"I certainly feel confident that within three or four years, and with the assistance and support contiibuted by the local officials, very substantial headway might be made towards both the re-establishment of the present fisheries and the inauguration of new and, what would in all probability eventually prove to be, still more profitable ones. I have read up the pamphlets and reports bearing on the ease kindly forwarded me by Mr. Collett, and was previously in possession of those by Mr. Edgar Thurston and others. Their perusal has still further convinced me that, with the advantage of my previous experience, the difficulties to be contended with are by no means insuperable, and I have in fact already sketched out some of the earliest and most essential steps in my plan of campaign that I should propose to follow or suggest, should the work in any form be entrusted to me."

CAMPHOR INDUSTRY.

One of the chief events of the year has been the fruition of the Japanese Government scheme for the conservation of the camphor-industry, which we outlined in March last. As was inevitable, the monopoly which was created has entirely altered the conditions of the market, the speculative market to a great extent having been obliterated. The price was originally fixed at about 180s, c.i.f. in March, but since then values have considerably advanced, 190s spot being quoted in November and "pressed" at 205s. For fluctuations in prices the palm must be given to refiners of German camphor, as no fewer than fifteen alterations have been recorded in 1900. On the other hand, English refiners, who are not influenced by speculators to the same extent, only raised their prices when absolutely necessary, and during the twelve months there have only been four advances, the year opening at 2s and closing at 2s 4½d.—*Chemist and Druggist*, Dec. 29.

PHOSPHATE IN THE MALAY ARCHIPELAGO.

AN IMPORTANT DISCOVERY.

A discovery of considerable importance to India has been made in a remote island of the Malay Archipelago. To make the story plain, it is necessary to go back some years when a party of scientists were sailing the seas in the now famous vessel the "Challenger." Amongst the most distinguished of them was Sir John Murray who has recently been in India [spending a week in Ceylon first.—Ed *C.O.*] This gentleman had studied the question of the deposits of the deep-sea bottom, and when the "Challenger" was off Christmas Island a lovely place in mid-ocean to the South of Java, he found phosphate of great purity in the haul brought to the surface from the bottom by the deep-sea dredger. Now phosphate is an exceedingly valuable manure Treated with sulphuric acid it forms the super phosphate that is in demand for indigo cultivation. Sir John did not let the matter rest. Phosphate on the sea-floor might be valuable but it was not easy of access. It had been formed, he surmised, by the dropping to the bottom. through countless ages, of the remains of dead marine animals from the two geographical zones that here meet each other, the intermingling of water of different temperatures causing the mortality to be excessive; the fish from the waters of the north unable to stand the warmth of southern seas; those from the south similarly discomforted by the colder current. The island hard by might have had an analogous origin, so he examined it. It proved a veritable phosphate heap. Negotiations were commenced for its annexation. But years elapsed before this was affected. The British marine authorities indeed declared, at first, that the place was useless, and at one time mining operations narrowly escaped being undertaken under Dutch auspices. But at last the British flag floated over the possession, and a number of borings were made, the result fully confirming the sanguine expectations of the discoverer. A European chemist was brought out to superintend the the operations, and now large quantities of phosphate are being raised at a profit. The matter is of more than academic interest. Not only does it offer possibilities of supplying an indefinite amount of the dressing needful for the indigo fields, but the process of preparing the raw article for application means a demand for sulphuric acid which may not be without effect on the question of making the mining of the sulphurous copper ores of Western Bengal remunerative.—*Bombay Gazette*, Jan. 27.

TWO ISLANDS SET APART FOR CULTIVATION.

From the *Globe* of December 21st we learn that the United States Department of Agriculture has set aside the islands of Panay and Panitani in the Iolo Islands for the cultivation of India-rubber, as the American supply is failing. On the other hand reports from South America do not indicate any falling-off in rubber supplies from the back country of the Amazon aswell as the Andean Valleys.

NEW TEA MARKETS SUGGESTED.

EAST AFRICA AND FIJI.

There are two possible openings for establishing a trade in our medium teas that should not escape notice, the one in Mombassa, in East Africa, where not only are there many Indian emigrants among whose rations tea might well be inclnded, and another in Fiji, the coolie trade to which is assuming increasing proportions. The rate of coolie pay in Mombassa is, we are informed, £1 per month, but the rations come up to an extra £2, while once out of his indentures the laborer nets a clean £5. It is not only among the imported labor that we may look for consumption but there is a steady influx of people from all parts, and our informant (a ship's officer) says that there is quite as marked a predilection for tea as for the home-grown coffee; the latter, however, owing to the cost of labor given

above, places it beyond the reach of the masses, while the use of the former is confined to the well-to-do. As for producing tea on any commercial scale with the wage rate ruling so high, that is out of the question, although the tea plant, grown as an experiment, has been successful enough. The development of East Africa is proceeding at as rapid a rate as Australia in 1850-51, so those first in the field ought to establish a firm business.

The tea trade with Fiji proper would be of a limited character; but as the coolie vessels subsequently go to the South Pacific ports to load for Europe, we have in these an as yet untouched market, while not far north there are thousands of labourers employed on the western terminus of the Nicaragua Canal in the Gulf of Panama. These small markets are bound to expand into large ones, offering better facilities for introducing a novelty than those already occupied by established rivals; not that we suggest any relaxation of efforts in Europe or America, but merely ask that places at present considered of minor importance should receive a fair share of attention.—*I. P. G.*, Feb. 9.

MEASURING RAINFALLS.

THE WORK OF 3,500 AMATEUR SCIENTISTS.

In every district, in every county, of the British Isles there are amateur scientists who take measurements of every fall of snow or shower of rain that occurs. This work is of immense interest, directly or indirectly, to all classes of the community. It is controlled by the Rainfall Organization. Yesterday Mr. Sowerby Wallis, who has made it his duty to receive the reports of these systematic observations and record them, gave an account of the work to an "Express" representative. "Forty years ago," he began, "my predecessor, Mr. Symons, commenced to study the rainfall of the British Isles, and found that there was very little knowledge on the subject, and even that was in a chaotic condition. In 1861 he wrote to all the observers, of whom he was aware, for records for the year 1860, with the result that 168 were sent in, and afterwards published. This gave a stimulus to observers, with the result that their number now exceed 3,500. The subject has been studied scientifically for the purposes of water supply, flood prevention, drainage, and river conservancy. The great majority of the observers are amateur scientists among doctors and clergymen. A large number, too, are maintained by the engineers of corporations and water companies." As a rule the work is done thoroughly. But that the observers are sometimes slack the following stories will show:—

"A Scotsman religiously kept his gauge out in his front garden during the daytime, but always took it in at night. His reason for this was that he was afraid it might be stolen. Another time a country parson, instead of sending in the record, posted the amount of the previous Sunday's collection."

HOW IT IS DONE.

"How is the rainfall measured? By a gauge costing from 12s 6d to £3 3s. For use in ordinary localities we recommend the Snowdon pattern. This consists of a copper or galvanised iron cylinder 15in. deep and 5in. in diameter, and containing a funnel and jar. Every week or month the jar is emptied and measured in a tube which is divided into 1-100ths of an inch. Snow, of course, has to be first melted. The gauge is placed on a level piece of ground at a distance from shrubs, trees, walls, and buildings. Readings are taken at 9 a.m." "Knowledge of rainfall," continued Mr. Wallis, "is of the greatest importance to the country." All water is rain-water, whether it be stored in tanks, water-butts, wells, springs, or rivers. When a town wants an increased water-supply the first thing to look for is a district where there is a heavy annual rainfall. That information we supply. Again, to agriculturists trustworthy statistics as to the annual rainfall in a country is of the utmost value. To river conservators figures showing the time it takes for a fall of rain over a given area to run off allow precautions against floods, such as the opening of locks and sluices, to be taken.

"In France the various parts of the great rivers are in telegraphic communication with one another. A heavy rainfall in the upper reaches, with its necessary consequences, is known at once lower down. With such a system on the Thames a great deal of destruction of property during storms would be avoided."

The work of the Rainfall Organisation is purely voluntary. The money derived from the sale of "British Rainfall," which is a general summary and epitome of the year's work, supplies the necessary funds. Mr. Wallis calculates that he spends at least six weeks every year in giving evidence before water committees and inquiries. His work is therefore recognised. At every Parliamentary Inquiry or Commission dealing with water questions, since the Duke of Richmond's famous Commission, Mr. Wallis and the late Mr. Symons have given evidence. Among the "observers" have been three Speakers of the House of Commons; the Dukes of Wellington, Westminster, and Argyll; Lord Addington, the late Mr. W H Smith, and many members of Parliament.—*Daily Express*, Jan. 10.

OUR BOTANIC GARDENS AND VEGETATION.—The special feature of February's issue of our *Tropical Agriculturist* is the Report by the accomplished scientist and botanist, Dr. Treub, head of the Buitenzorg Botanical Gardens, etc., in Java, on his visit to Ceylon and its Botanic Gardens over two years ago. It was published in Dutch and translated for us, the first portion by Mr. Advocate de Vos of Galle, and the rest by Mr. Donald Ferguson of Croydon. We regret the delay in giving the translation to the readers of the *T.A.*, but the concluding portion will appear in the March issue. Dr. Treub's observations are full of interest for their realistic freshness, and for a stranger he makes singularly few blunders. He accounts for Java, with only double the area, having eight times the population of Ceylon, by the dry if not thirsty climate over the larger portion of our island and the comparatively poor soil. He shows us how superior is the Javanese system of rice cultivation to that of the Sinhalese; he is delighted with the contrast between patanas and forest; does justice to the work of Thwaites and Trimen; as also to the energy of Ceylon planters, and generally writes a very appreciative notice, at least so far as Part I goes.

ADVENTURE WITH A LEOPARD.

The town of Nagercoil, in Travancore, was thrown into a state of wild excitement on Saturday morning last when it was reported that a leopard had found its way into the town and was hiding in a field near the Ooluganachery bridge. Large numbers of people collected at the spot, and, taking up positions at convenient distances, watched the movements of the brute, which had already attacked two men. Word having been sent to Vadasary, Mr. J Duncan Roberts and Mr. F A Cox hurried to the field, and while they were walking along the bund, without seeing any sign of the leopard, the bystanders called out to them that the brnte was lurking in the grass. Turning round and walking a few paces, Mr. Cox's attention was arrested by a low snarl and on looking round he saw the brute spring on Mr. Roberts. A Shanar man who happened to be near rushed forward and diverted the attention of the animal on to himself, while one of the shikaris present fired and killed the brute. Mr. Roberts was badly mauled on both hands and suffers a great deal, but his injuries are believed and hoped to be not dangerous. The leopard is a fair-sized one and well-marked. The presence of mind and pluck shown by the Shanar, in saving the life of another at imminent risk to his own, are beyond praise.—*Madras Mail,* Feb. 14.

PRESERVATION OF THE WILD ANIMALS OF THE SOUDAN.

A CEYLON MAN TO THE FORE.

The Anglo Soudanese Government is forming a "Soudan Wild Animal Department," the object of which is to preserve the wild beasts of the Soudan, which between the time when the country was closed after the death of General Gordon and the capture of Khartoum had greatly increased. Indiscriminate slaughter in this, one of the few preserves left in the world, will be checked and regulated: and one of the branches of the department will be the supply to Zoological Gardens, Museums, &c., of live and dead specimens. The Soudan Government offered the post to Mr. Butler, who,

SINCE HE LEFT CEYLON AND TEA-PLANTING

four years ago, went on an expedition to the Andaman and Nicobar Islands, collecting birds for Mr. Walter Rothschild, of Tring. The work he found delightful, but it was very hard, and he resigned, taking up similar work in Perak. He then obtained under the Selangor Government the curatorship of the Straits Museum, and occupied this position when he received the offer from the Soudan Government. As may be well imagined the number of candidates suitable for such a post is limited, but the offer made to Mr. Butler required his quick decision. He wired assent, threw up his post in the Straits, and booked a passage by the Japanese ss. "Shinani Maru" for Port Said.

The action of the Anglo-Soudanese Government in taking steps to preserve the wild animals of the Soudan is most praiseworthy. It is only necessary to glance at the recent records of travel, not merely in Africa, but in other haunts of big game in various parts of the world, to see that valuable types are following the dodo and great auk into premature extinction. We need hardly dwell on the pity of this event. On the lowest ground it is extremely bad economy to use up in one great battue the sport of generations to come; on higher grounds it is a crime against posterity to deprive the science of the future of the very elements of practical investigation.—*Egyptian Gazette,* Jan. 28.

PRODUCE AND PLANTING.

THE MOVEMENT FOR RESTRICTING THE OUTPUT OF TEA.—The Calcutta correspondent of the *Times* cables under date January 22:—"The Indian Tea Association has addressed a circular letter to all proprietors and agents of estates with a view to limiting the output and consequently enhancing prices. Opinions are invited on the following proposals: The temporary abandonment of 10 per cent. of the area in full cultivation; the fixing of a date for closing manufacture in each district; generally finer plucking; and that a percentage of the crop consisting of low-grade teas be placed at the disposal of the Association, and utilised for encouraging the consumption of tea by the natives of India."

A WISE SUGGESTION.—Mr. Cuthbert Burgoyne, writing from Mount Ophir Vineyards, Victoria, puts in a plea for Imperial products which will specially commend itself to Indian and Colonial planters and producers, and he says: "At the beginning of a new century, when the civilised world is throbbing with the growth of the Empire, a plea for patriotism, even in trade, may not be misplaced. In the daily struggle for existence patriotism should not be lost sight of. If 'self' had dominated our feelings, the British Empire would not hold the powerful sway it does today. By giving preference to Colonial products, the grocer can assist in the augmentation of Britain's power without detriment to his own pocket. The British Empire prodnces from some corner of her vast dominions everything needful to mankind. Encourage, then, the tea-planters of India and Ceylon, the Colonial cane sugar mills, and push the cocoa of the British Colonies. New Zealand and Australian butters are quickly creeping into favour, and the full-bodied Australian wines have made their mark on French imports, and have come to stay. Spices are, to a very great extent, Colonial, and before many years the grocer will be able to place British dried fruits and coffees before his customer. Whatever is good for the British Colonist is good for the Empire. Let us always bear in mind that Greater Britain has her vineyards, her tea and sugar plantations, her rice fields, and her spice and orange groves, and, that in the present condition of the world, commercial interest are all powerfnl. Give preference to Colonial products, overrnle the Englishman's prejudice against a new article, and the commerce of the Empire will be strengthened. As unity is strength, if we all work to one end, the result must be to the benefit of the empire." This idea might commend itself to the Chancellor of the Exchequer in connection with the tax on tea. While the Government does nothing in particular to foster British-grown prodnce, we fear that individnal members of the great trading community throughout the British Empire cannot be expected to give such evidence of true patriotism as is indicated by the correspondent from Monnt Ophir. The prosperity of the British Colonist or the Anglo-Indian weigh very little against the needs of the Imperial Exchequer.—*H. and C. Mail,* Jan. 25.

CACAO CULTIVATION.—We direct attention to a very suggestive letter on this subject by a practical cacao planter. It deserves the careful consideration of his brethren, whose criticism on any of the points raised will be welcomed. The problem submitted by "P.O.D.", as to what could be done with a limited number of trees per acre, specially treated as regards pollination, is eminently one adapted for experiment in the Peradeniya Gardens where the soil is, we suppose, no more than a fair average of our cacao districts.

THE KALUTARA COMPANY, LIMITED.

ACREAGE, 31ST DECEMBER, 1900.

Tea in bearing	518 acres
Tea in partial bearing ..	140 do
New Clearings	24 do
Arecanuts, Grass, Ravines, &c..	10 do
	692 do
Forest	392 do
Total	1,084 acres.

The Directors herewith present the accounts for the year ending 31st December, 1900.

The crop secured (including 4,653 lb. manufactured from purchased leaf) was 292,305 lb. tea against an estimate of 333,000 lb. The average net price realised was 31·32 cents per lb., against 36·89 cents per lb. obtained in 1899. The cost of the tea laid down in Colombo was 26·07 cents per lb. which included a sum of R5,691·75 spent on manuring.

In addition to a fall in price of 5·57 cents per lb. in common with most other low country estates, it will be observed that the crop was 40,695 lb. short of estimate. This most disappointing result was directly due to a local drought of unprecedented severity, experienced in the early months of the year, from the effects of which it took some time for tea bushes to recover. The reduction in amount of crop also added to the cost per lb. of securing it, which was in consequence distinctly high.

The new clearing, 24 acres in extent, planted during the past year is coming on satisfactorily. The growth of Para Rubber is promising and the Directors purpose extending its cultivation on the Company's estates.

After making ample provision for depreciation of building and machinery and paying the interest on the preference shares, there remains a balance at credit of Profit and Loss Account on the the year's working of R1,006·56, to which has to be added the balance of R5,921·79 brought forward from 1899, making in all a sum of R6,928·35 to the credit of Profit and Loss Account, which the Directors recommend be carried forward to the current season's account.

The capital expenditure for the past year amounted to R6,571·61, chiefly on the opening up of 24 acres in tea and for new lines.

For the year 1901 the estimate of crop from the Company's estates is 324,715 lb. Tea, as against an estimated expenditure of R73,693·69 on working and R3,448 on capital account. The latter expenditure being mainly on lines and the upkeep and supplying of the new clearing.

During the year under review Messrs. R S Templer and G H Alston resigned their seats on the Board on their departure for England, and Mr. H Cumberbatch and the Hon. Mr. W H Figg were appointed to fill the vacancies respectively.

In terms of the articles of Association Mr. H Cumberbatch now retires from the office of Director, but is eligible for re-election.

The appointment of an Auditor for the current year rests with the meeting.

THE GANGAWATTA ESTATES COMPANY OF CEYLON, (LTD.)

ACREAGE :

Tea in full bearing	335 acres.
Do partial bearing	2 do.
Do not in bearing	8 do.
Grass and Ravines	10 do.
Total	355 acres.

The Directors beg to submit their Fourth Annual Report and Statement of Accounts for the year ended December 31st, 1900.

The Tea crop amounted to 171,406 lb., against an estimate of 160,000 lb., which was disposed of as follows :—

Sold in Colombo	170,983 lb. for	R61,515·88
Sold on Estate	291 lb.	263·96
Carried forward to next year	132 lb.	—
	171,406 lb.	61,779·84,

or an average per lb. of 36·07 cts. as compared with 40·16 cts. last year.

Cost of production was ..	25·65 cts.	
including Manure ..		2·95 cts.
As compared with last year ..	27·06 cts.	
including Manure ..		2·70 cts.

The season was an undoubtedly favourable one throughout the Tea districts, and is responsible in great measure for the heavy output of tea and the consequent overloading of markets and fall in price.

The area manured with artificial manure was 120 acres, which, with 60 acres manured last year, leaves five acres only untreated on the Gangawatta division of the property.

The working account shows a surplus of R18,001·01, an interim dividend of 3 per cent. has been already paid, and the Directors propose to pay a final one at the same rate making 6 per cent. for the year.

After this payment, interest on mortgage, commission to Superintendent and Secretaries, and Auditor's fees, a balance will remain of R3,190·06 subject to payment of Directors' fees, and it is proposed to carry this sum forward to next year.

A regrettable accident of the year was the loss of the newly-erected wire bridge in the floods of June; half cost of reconstructing this remains to be met in 1901.

Some expenditure will probably have to be incurred for providing the factory with fans. In times of pressure the withering accommodation is at present insufficient. No provision for this is made in the estimate.

Mr. Hayes reports that the property is in good order.

Crop estimate for 1901 is R170,000 lb. Expenditure is estimated at R44,706·50, which includes R425,725 for manure. This will be applied almost entirely to the Bitterne division.

In terms of the Articles of Association Mr. S. H. Hayes retires from the office of Director, and being eligible offers himself for re-election.

The appointment of an Auditor for the current year rests with the meeting.

AGRA OUVAH ESTATES COMPANY, LTD.

THE REPORT.

The Report was as follows :—

ACREAGE, 31st December, 1900.

Agra Ouvah.

Tea in full bearing ..	302 acres.
Tea not in bearing ..	20 ,,
Grass and Jungle ..	9 ,,
Total Estate ..	331 acres.

Fankerton.

Tea in full bearing ..	15 acres.
Timber clearing ..	10 ,,
Grass, Patana and Scrub	18 ,,
Total Estate ..	193 acres.
Grand Total ..	524 acres.

The Directors now have to present to the Shareholders the accounts for the past year.

The crop secured amounted to 374,274 lb. (being 84,274 lb. in excess of the estimate) as against 293,908 lb. in 1899.

The average nett price obtained for the tea was 45·02 cents per lb., against 48·90 cents per lb. in 1899. After deducting the cost of manufacturing outside leaf, the cost of laying down the Company's tea in Colombo

was 23·18 cents per lb. The gross income derived from manufacturing tea for other estates was R11,975·90.

Allowing for Depreciation on the same scale as last year, the amount at credit of Profit and Loss Account for the year's working is R79,989·34 equal to 21·30 per cent on the Capital of the Company, to which must be added a sum of R2,794·58 brought forward from last year, bringing up the total at credit of Profit and Loss Account to R82,783·92. An Interim Dividend of 7 per cent was paid on 30th July last, absorbing R26,250. The Directors now recommend the payment of a final dividend of 13 per cent, making 20 per cent for tho year; that a sum of R5,000 be transferred to the Reserve Fund for the equalization of Dividends, and that the balance of R2,783·92 be carried forward to the current season's account.

The estimate for this year is 343,750 lb. Tea on an expenditure of R82,092·39, including a sum of R6,220 for manuring.

During the year under review Messrs. Alston and Polson resigned their seats on leaving the Island, and their places were taken by Hon. Mr. W H Figg and the late Mr. A E Wright, at whose loss the Directors desire to record their deep regret. Mr. Jas. Forbes was appointed to fill the vacancy thus caused on the Board.

In terms of the Articles of Association tbe Hon. Mr. W H Figg retires by rotation from the office of Direcort, but is eligible for re-election.

The appointment of an Auditor will rest with the Meeting.—By order of the Directors,

WHITTALL & Co., Agents and Secretaries.

Colombo, 25th January, 1901.

CEYLON MINING AND THE GEOLOGICAL SURVEY.

We omitted the other day to refer to the promised Geological Survey of Ceylon as an indispensable preliminary to the development of the mining industry of the Colony. When this Survey is completed, the Government will be much better able to revise and formulate definite regulations. —In this connection we may refer to the discussion following on the reading of a Paper on "Metalliferous Mining in India" by Dr. Evans (ex-State Geologist and Chief Inspector of Mines in Mysore) before the Society of Arts. We quote as follows :--

MR. ALEXANDER ROGERS writes :—At the conclusion of the discussion on Dr Evans' paper yesterday I said that I had intended to lead the discussion in a new direction, but that I refrained from doing so because the lateness of the hour would not permit of my expatiating properly on the subject. I now write to explain what my subject was, and to call attention to the subject of the mining regulations issued by the Government of India, which appear to me admirably calculated to crush all mining enterprise, instead of encouraging people to develop India's great mineral resources, as they should do. This is specially the case in the part of Central India which has not been mapped in the Geological Survey map of the country, as it is here particularly that there is the largest field open for research. It is all more or less under the charge or administration of political agents, who, as a rule, are military officers or men whose studies have not led them to inquire into such subjects. The greater, therefore, is the necessity for encouraging the efforts of outsiders to ascertain and develop the resources which at present are lying dormant for want of exploitation. I propose now to give you an instance, which I can personally vouch for, of the method in which the supposed intention of the Government of India to open out the country is acted up to locally. There are two villages on the outskirts of a low range of hills in the Rava Kanta political agency to the north-east of Baroda, which contain extensive deposits of the finest iron. Having discovered those valuable deposits, which are particularly rich in the villages mentioned above, I applied for a prospecting licence in them with a view to temporarily keep other prospectors out of the field, and suggested that a small sum of 50 rupees should be paid in each village. I received an answer that I had not complied with the rules of the Government of India by fixing on the exact spot where operations were to be carried out. I could not have done this without the advice of a mining expert. It was then suggested that the difficulty could be met by taking licences for the whole area of the two villages, which had never been surveyed, at the rate of 4 annas an acre. The estimated area came to 1,800 acres, so that the amount demanded was 450 rupees, in addition to 100 as a deposit on each licence, or a total of 650, which would only have protected me for a single year. I wrote to expostulate with the Supreme Government, and was finally offered by the Government of Bombay licences at 1 anna, in place of 4 annas an acre; that is, for 350 instead of 650. This has been finally declined, and I only bring it forward in order to show the penny-wise-and-pound-foolish policy that is being pursued, a policy which appears to me well calculated to stop all mining enterprise. Prospecting or exploration licences of the protective character asked for should, I think, be granted gratis, some kind of security only being required in order to provide against wilful injury to any property having an appreciable money value on the part of prospectors or explorers. I will not go further at present to inquire into the condition for mining licenses offered by the rules, but would suggest that such mining firms as J. Taylor and Sons should be consulted on the subject, especially with regard to such particulars as that no two shafts should be sunk within a certain distance of each other.

DR. EVANS:—I cannot concur in Mr. Rogers's censure of the Indian mining regulations. They may not be perfect but compare not unfavourably with those of other countries. If any one interested in mining believes a particular region to possess mineral wealth, he can take out an exploring licence at a cost, which varies in different parts of India, but never exceeds ten rupees. This gives him, it is true, no definite rights, but it is expressly laid down that in considering rival claims for mining concessions, "due regard will be had to operations conducted under cover of an exploring licence." If a valuable deposit is found, but the limit of its occurrence cannot at once be readily determined, a prospecting licence may be taken out over a comparatively larger tract till a proper survey can be made. When this is completed, the licensee is entitled to a formal mining lease of the block he ultimately decides to select. In most other mining countries not only is the amount of mining land which the prospector can take up much less, but he can acquire no rights till he has actually "pegged out" the boundaries of this small area. Mr. Rogers would have been far worse off in Australia, for instance, for there he would have had no means of safeguarding his rights while waiting for the arrival of his mining expert. I cannot regard a penny an acre, amounting altogether to £7 10s., as an exorbitant charge for obtaining preferential rights over nearly three square miles for a whole year. The R100 £16 13s. 4d) is only in the nature of a deposit.

A LABORATORY IN COURSE OF CONSTRUCTION.— "At Hakgala, we have just learnt," a Nuwara Eliya correspondent writes to us, "that a laboratory is being built at the Gardens with a special view to Research work being carried on *there*, as well as at Peradeniya, by Professors who come out to Ceylon for that purpose. Rooms are also to be put up adjoining the laboratory for the scientists to stay in. So far only the timber is being felled ready for the building, but they hope to have the work in hand shortly."

TO ALL PARTS OF ASIA, AFRICA, AMERICA AND OCEANIA.

Seeds & Plants of Commercial Products.

Hevea Brasiliensis.—Orders being booked for the coming crop August-September delivery 1901, booking necessary before the end of April, quantities of 100,000 and over at special low rates. Plants available all the year round. 100,000 and over at special low rates. A leading Rubber planter in Sumatra, who purchased 50,000 seeds in 1899, and 100,000 in 1900, writes us, under date 15th November 1900:—"I received your letter of 20th October, from which I learn that you added another case of 5,000 seeds to replace the loss, &c. I am satisfied hereby, and even after this adding I am satisfied by the whole delivery of this year."

Castilloa Elastica.—True superior variety cultivated in Mexico, seeds from specially reserved old untapped trees. Orders booked for August-September delivery 1901, booking necessary before the end of March; large quantities on special terms; Plants in Wardian cases.

Manihot Glaziovii.—Seeds and Plants available all the year round, 100,000 and over at special low rates. A Mexican planter in sending an order for this seed wrote on the 22nd August, 1900:—"If they arrive fresh and germinate easily I may send you larger orders, as they are for high ground where the Castilloa does not thrive."

Kickxia Elastica.—(*Funtumia Elastica*).—Seeds and Plants, orders booked. (Lagos rubber.)

Ficus Elastica.—Seeds available in May-June; booking necessary before the end of March; also plants.

Urciola Esculenta and **U. Elastica.**—Same as above. (Burma rubber.)

Parameria Glandulifera.—Orders booked for seeds for January-February delivery; also plants immediate booking necessary. (A good rubber creeper of Malacca.)

Landolphia Kirkii.—Seeds in July-August, early booking necessary. Plants can be supplied all the year round. (A highly-recommended species.)

Chonemorpha Macrophylla.—Seeds and Plants; orders booked. (A very valuable rubber-yielding creeper.)

Memusops Globosa and **Payena Leerii.**—Seeds and plants in July-August, booking necessary before April.

Achras Sapota, Willughbeia Firma, W. Edulis and other **Rubber and Gutta Percha** yielding Trees and Creepers, Seeds and Plants.

Cinnamomum Zeylanicum (Cinnamon superior variety). New crop of seed in April to June; booking necessary before the end of February; also plants.

Coffea Arabica, Liberian Hybrid and **Maragogopie Hybrid.**—New crop March-April; immediate booking necessary.

Cinchona Ledgeriana.—Seeds now ready, also other varieties.

Seeds and Plants of Nutmeg, Clove, Sandalwood (white and red), Pepper, Cardamom, Vanilla, Cacao, Tea, Coca, Fibre, Medicinal and Fruit Trees, Shade and Timber Trees, Eucalyptus various varieties, also Palms, Bulbs, Orchids, &c.

Our enlarged Descriptive Price List of Tropical Seeds and Plants of Commercial Products of Foreign countries for 1901-1902, now being prepared, and will be ready in a few months.

"SOUTH AFRICA."—The great authority on South African affairs of 25th March, 1899, says:—"An interesting Catalogue reaches us from the East. It is issued by WILLIAM BROTHERS, Tropical Seed Merchants, of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbling. We recommend the great Powers and Concessionaries under them to go to William Brothers."

Price List of Seeds and Plants for CEYLON use post free on application.

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PLANTING IN THE STRAITS.

EXPERIMENTAL PLANTATIONS:—RUBBER, GUTTA, SUGAR, COCONUTS, &c.

REPORT BY SUPERINTENDENT OF EXPERIMENTAL PLANTATIONS.

SIR,—I have the honour to submit a Report of my visit to Penang, Province Wellesley and Perak.

Acting on instructions received from the Acting Resident-General, W. H. Treacher, Esq., C.M.G., I left Kuala Lumpur on 25th October with the object of visiting the Botanic Gardens in Penang and the estates of Perak and Province Wellesley, with a view of obtaining a knowledge of the country and the requirements of the planters, and, at the same time, selecting a suitable place as head-quarters for the Experimental Plantations which Government are about to establish.

In Penang I met Mr. Curtis, the Superintendent of the Botanical Gardens, and with him visited he Gardens, where rubber-tapping was in progress. Although the trees here are not growing under the conditions generally recommended for Hevea braziliensis (Para-rubber)—being planted on a dry, sandy bank—it is interesting to note that the returns are very favourable; the average annual yield for the last three years amounting to rather more than 1 lb. of dried rubber. It appears, therefore, that not only does Hevea thrive under varied conditions, but that it gives a fair return, which statement does not apply to Ficus elastica, the "Gutta rambong" of commerce.

I journeyed to Kuala Kangsa, and, accompanied by Mr. Derry, inspected the Para trees recently tapped by him, and other economic plants growing in the Government grounds. The average yield per tree was 1½lb. of dry rubber, the trees ranging from six to thirteen years of age. As this Officer points out, "the tappings were not exhaustive," and it is probable that more might have been extracted without impairing the health of the trees. What this amount is, has yet to be determined, neither Mr. Curtis nor Mr. Derry having attempted to decide the question.

Kuala Kangsa having been suggested as a suitable place for head-quarters, I made the visit here a special feature of my tour. After duly considering the matter, however, I must say that I fail to see that this district offers any special advantages over other places I have visited. I am of opinion that Kuala Lumpur, or its immedite neighbourhood, would be more suitable, seeing that it is much more central.

From Kuala Kangsar I proceeded to Sungei Siput, and, after visiting the Kamuning Estate, went on to Ipoh, where I had the benefit of an interview with the Acting British Resident, Colonel Walker, C.M.G., who advised me to go to Batu Gajah to see the estates in the vicinity and the Government Plantations at Parit. This I accordingly did, and, accompanied by Mr. Cecil Wray, I also drove out to see the large rambong and Para trees.

In the limestone districts of Kinta rambong grows very luxuriantly; but, so far as I am aware, it does not occur naturally either in the marshy districts or along the coast.

On returning to Ipoh I had a further interview with Colonel Walker, and, acting on his advice, I retraced my steps to Taiping, with the object of visiting the Krian district and the Province Wellesley sugar estates. I might here remark that it is the opinion of Mr. Turner, the Manager of Caledonia Estate, that sugar might be successfully cultivated in some parts of the interior. This is somewhat important, in view of the fact that beet-root sugar cultivation is on the decline in Europe.

From Prye I proceeded to Teluk Anson *via* Penang. Here Mr. Brewster kindly enabled me to visit the coconut estates on the Perak river and the rubber plantations at Setiawin, by placing the Government launch at my disposal.

At Setiawin there are a number of fine specimens of Hevea and Ficus, which would be suitable for experimental work.

In reference to Ficus elastica, I would like to point out that it has been proved in Bengal and elsewhere that "although it grows with undiminished rapidity and luxuriance in districts remote from the hills . . . it fails to produce caoutchouc." Dr. Morris also says that, in spite of the abundance of the tree under cultivation in the tropics of both the Old and the New World, it has nowhere proved so valuable for the production of rubber as in the mountainous parts of Assam.

It seems, therefore, that there is a possibility of this tree failing to come up to the expectations of the planters of this country, and I would advise Government to allow me to proceed to Setiawin, to experiment on these trees with a view to obtaining reliable data concerning their yield. It would be necessary to rent a sufficient number of Ficus from the Penghulu. The Para trees are Government property.

STANLEY ARDEN,

Superintendent of Experitmental Plantations.

BIG TEA-GROWING SYNDICAE IN CAROLINA.

A syndicate has purchased 4,000 acres of land 15 miles from Charleston, South Carolina, United States of America, where a tea farm will be started. Unlimited capital is behind the venture and the syndicate will deliver at least 300,000 lb of tea for the American markets annually after the area is in bearing. It is evident that Americans are beginning to look upon tea as a possible industry.—*Indian Planters' Gazette*, Feb. 16.

THE USE OF SORGHUMS.—The use of the sorghums as forage plants is rapidly increasing in all countries which are semi-arid or subject to frequent long summer droughts. As the use of the plant increases there is an increasing desire to use it as pasture, but there is a reluctance to do so from the fact that there has sometimes been a loss of stock fed upon the growing plant which could not be accounted for upon the theory that death was caused by ordinary bloat. While these cases have been rare, yet they have occurred, and the cause is not yet known. The Nebraska Experiment Station has been thorough in its investigations, but so far has learned nothing. Samples of sorghum which had killed a cow within a few minutes after eating it disclosed no trace of any poisonous substance when analysed a few days later. The station authorities are forced to conclude that sorghum sometimes, when growing or freshly cut, contains poison which soon disappears in the process of curing, so that by the time the samples reach the laboratory and are analysed they are harmless. There is at any rate no danger in feeding cured sorghum, and a great deal of sorghum is pastured with no injurious results, and yet the fact that deaths, not from bloat, have sometimes occured from its use makes it an undesirable pasture crop until we know more about it. It is suggested by the station authorities that in cases where poisonous effects followed its use the plant itself was probably unhealthy and yellow, but there are not sufficient data on that point to justify a very strong opinion.—*Weekly Chronicle.*

PLUMBAGO: CEYLON'S ONLY MINERAL OF COMMERCIAL IPORTANCE.

We learn with much regret that the Morgans Crucible Company—represented here by Mr. R. C. Fielding—have decided, after much consideration, to give up mining for plumbago in Ceylon, since neither the laws nor the conditions seem to them to offer any inducement for the investment of capital in the industry. This would be a matter dedemanding the serious attention of Government, were it not for the undeniable fact that native capitalists seem to prosper and to multiply as miners, under the same laws and conditions as are deemed so inimical by the great Battersea house, so long identified with the purchase and utilisation of Ceylon plumbago. Have we not here another illustration of the fact that there are certain trades and industries in this tropical island in which Europeans are unable to compete with the natives? It used to be an axiom in the Fort, during the "seventies" and "eighties," that no European merchant could successfully compete with the Chetties in the importation and sale of rice. The most notable attempt to develop a rice trade was by C. Shand & Co. who had, for several years, a special Agent (as hrewed a Scot as ever did business) stationed at Chittagong to buy rice at first hand, and ship it to Colombo; but after a time, the agency was not found to be profitable and had to be abandoned. The spell has been broken within the past few years by the advent of Calcutta experts in the trade, and here we may speak of an exception to the rule of the previous decade. But again, in regard to "gemming" and Mining for Gems, Europeans have on several occasions entered the field, operating through Syndicates and Limited Companies; but so far without success. And now it would appear as if Plumbago mining were to be added to the failures; for, certainly, no Company or Association in the world could have entered the local field with a greater backing of capital, authority and experience of the mineral sought for, than that represented by Mr. Fielding. At the same time it cannot be forgotten that our plumbago industry has been one of considerable and growing importance for the past fifty, sixty and well-nigh seventy years, though the mining was confined entirely to native hands. So far back as 1836, the export of plumbago was 12,644 cwt.; in 1846 (with many fluctuations in the interval, down to 423 cwt. in 1839) it was 25,037 cwt; in 1857 (again with extraordinary fluctuations between) it stood at 33,497 cwt.: in 1869 there was an enormous increase to 226,131 cwt. which was only exceeded in 1881-2-3- when 262,714 cwt. was reached in the last-mentioned year. Since then, the average annual export for the five years ending with 1888 was 216,472 cwt., rising in the quinquennial period ending with 1893 to 408 418 cwt.; while for the next four years the Export was very steady at between 335,000 and 357,000 cwt. Then in 1898 came a rise to 473,000 cwt. and in 1899 to the exceptional maximum of 616,000 cwt.—falling last year to 383,000 cwt. Now, until about five or six years ago, when the late Mr. C. Tottenham—with the remarkable prescience for which he was distinguished—interested himself in plumbago mining and finally got out Captain Tregay, as a practical Cornish Mining Engineer, to develop the mine on his Monerakande property,—it cannot be said that Europeans took any practical share or much interest in the industry. We have, therefore, a purely native plumbago mining industry which has built up an export of over 400,000 cwt. (it was 427,000 cwt. in 1892) with practically no extraneous help and which may, therefore, be supposed to be equal to the present trade, if not the actual requirements of the European and American markets. All this must be taken into account in dealing with the question as it now stands, as well as the fact of the withdrawal of the great Battersea Company after little more than three years' mining experience.

On the other hand, no civilized, progressive Government can content itself with the actual results we have shown, without taking into account the means by which they were produced. Until of late years, the working of Plumbago Mines in Ceylon was a disgrace to the British Government. There was no inspection, or care for the manner in which the lives of the labourers were endangered, and, if all accounts were true, no reports or enquiries were made in reference to numerous casualties. Even now that we have Inspectors, we have statements reaching us that many of the employees in the pits are little better than slaves, are badly treated and badly paid, and are allowed or encouraged to become demoralised by constant arrack-drinking—an illicit trade (not in the sense of cheating the Government, but of breaking the law) being developed round nearly every large mine or group of plumbago pits. Then again, it is alleged that a great deal of plumbago is illegally dug, and that bribery and corruption prevail to a large extent in certain native districts in connection with the mining. Of course, while failures of Europeans to make plumbago or gem mining (or even a rice trade) profitable, are notorious, one scarcely ever hears of the many native pioneers or capitalists who may have gone under, and whose non-success may possibly be due to causes which ought to be removed by a wise Government. And now we may consider the list of "obstacles," put forward by our evening contemporary, encountered by a European Plumbago-mining Company as doubtless experienced by Mr. Fielding and his principals. These are:—

(1) No owners of lands (whether natives of Europeans) that have ever been transferred from the Crown have any title to the minerals on them, according to the position now taken up by the Government.

(2) A good title to native-owned land, whether originally transferred from the Crown, or not, is practically impossible to find.

(3) The present mining rules do not offer a fair inducement to prospect and mine Crown lands.

(4) The delays in granting prospecting licenses, even after payment of the large deposit (R1,000) demanded by Government, forms a separate and most serious obstacle.

Practically therefore, the opening up of mines is barred in all directions under existing circumstances in Ceylon.

In contrast with these "obstacles" we are told of the much more favourable terms and conditions which prevail in India.* One great difference—and the difficulty which lies at the foundation of most of the "obstacles" above specified—is the absence of a "cadastral survey" in Ceylon Good titles cannot be got to much "plumbago" land, because the Crown is not as yet in a po-

* The Indian Mining Law is generally condemned by the Indian and English trade papers.

sition to say, definitively, to whom the land belongs. Natives, probably, dig with impunity in many cases, on lands to which they have neither right nor valid title. A cadastral survey is now in progress and when completed—or further advanced—all this could be rectified. But many years will be required before this is accomplished! —unless indeed the Governor gives orders to concentrate and strengthen the survey in the "plumbago" districts as the most pressing claim on official attention.

But apart from this question of survey, and in view of what we have said as to the mode in which Native Mines in many cases are carried on, and still more in view of the great difference between the Mining Laws and conditions prevailing in India and Ceylon, there is a case, in our opinion, for immediate Enquiry and Report. A Commission ought to be appointed, before the European gentlemen who have acquired so much unfortunate experience, leave the Island. Their evidence as well as that of leading native mine owners and managers, ought to be recorded, and could not fail to be valuable to the Government as well as to the public; and we sincerely trust His Excellency the Governor will take advantage of the opportunity now presented, to arrive at a right conclusion in respect of the working of the local Industry in Plumbago Mining.

Finally, we have to notice a letter on our sixth page which may be regarded as, in some sense, a warning to the Ceylon Government. But so far as substitutes for "plumbago" (as also for "rubber") go, we do not think much need be feared. The risk of discoveries of the mineral in other lands must, of course, be faced; but so long as Ceylon can give from 15,000 to 20,000 tons of its mineral to the world at a fair price, we think it should hold its own. Curiously enough last mail brought us a letter from the great American business house of "Joseph Dixon Crucible Co," of Jersey City, in which while anxious to get information on certain points—the request arriving in the nick of time to have the answer embodied in our "Handbook and Directory,"—they say not a word about "substitutes" or new "finds" of plumbago. It cannot be forgotten that the United States is our largest customer for plumbago, its demand far exceeding that for the United Kingdom. We are anxious to compile a reliable list of all the principal Plumbago Mines at present open in the island and trust to have a due response from the owners and managers to whom "forms" have been issued. Meantime, we repeat, the time is ripe for an Official Enquiry by Commission into the working of Ceylon Plumbago Mines, into the nature and effect of local Mining Laws as compared with those of India and as to how "prospecting licenses" can be more freely and promptly granted.

CEYLON PLUMBAGO CRISIS. IMPORTANT LETTER FROM THE MANAGING DIRECTOR OF THE MORGAN CRUCIBLE COMPANY.

SUBSTITUTE ALREADY FOUND IN AMERICA.—THREATENED REVOLUTION OF THE TRADE.

SIR,—I have read your* articles on Ceylon's mining laws and mineral wealth with great interest, and feel that you have rendered a great public service in calling attention to this subject, which is of such vital importance to Ceylon I consider, Sir, that such serious economic questions should be discussed in an absolutely calm and philosophic manner and free from anything approaching personality. I do not, therefore, endorse your strong strictures on local authorities, as I believe that the official apathy and opposition is due, not so much to any wish to discourage the industry, as to an entire want of appreciation of the risks and cost of prospecting and mining operations, which is, perhaps natural in a Colony whose principal industry is, planting.

It is obvious to anyone that in clearing jungle and growing tea, for example, the planter must spend his capital, and the approximate cost per acre can easily be calculated—what he does is easily recognised. The work of the prospector too frequently leaves nothing to show for itself, and the mining laws now in force in the island are evidence that it is neither understood nor appreciated by Government.

It is well-known that more gold is put into the ground than ever comes out of it as the rare reward of the successful prospector. What is difficult to make clear is the cost of even superficial prospecting in a country like Ceylon, where heat, jungle-fever, etc., are serious factors. Even if, at last, some indications of that most "chancy" mineral, plumbago, are found, expense on a far larger scale must be incurred to prove, in nine cases out of ten, that it is one that will not pay to mine. The Government have dealt with the subject more as if they had well-defined and accurately-located coal measures which they wished opened up by private capital than jungle land in which, possibly, one acre in ten thousand may contain some deposit of plumbago that would pay to mine.

In your first article and at the end of your fourth you allude to the fact that users of plumbago may be forced to find some cheaper substitute. On this point, perhaps, I can give you a little information. In a great measure this is a "*fait accompli*" in that they are learning to do without *Ceylon* plumbago. A great many trades are Ceylon's customers for plumbago. One of her best is the American manufacture of crucible steel. [The Sheffield industry has never used plumbago crucibles for this purpose.] I am well within the mark in putting down this customer for 3,000 tons a year. Just before leaving England I received a letter from America, from one who is in a position to know accurately the course of trade there, telling me that recent enormous prices had set the biggest people to work to do without plumbago, and that the result was a complete success and would revolutionise American consumption of plumbago. Another large customer of Ceylon is manufactured stove polish—a customer extremely useful as it takes the inevitably produced and otherwise unmarketable common dust.

Just before leaving England, again, I saw, for the first time, Chinese plumbago of a new character, and was informed that 1,000 tons of this were imported into the United States last year, and tests show that it will be equally appreciated in England.

The enormous rise in plumbago prices in 1899-1900 has been regarded in the light of a blessing to Ceylon, and as a subject for congratulation by Government, native pit-owners, and owners of estates. But if more were known of the course of trade hitherto dependent on Ceylon

* A local daily paper.

plumbago, it would have filled them with consternation instead of rejoicing. It was a tidal wave which will leave ineffaceable marks in the form of *permanently diminished demand.* In the twentieth century the price of a commodity cannot be trebled in twelve months with impunity and without ensuring that the ingenuity of man will devise a means of defence against a recurrence. The best friend of the Ceylon plumbago industry at the present moment is he who can do anything to assist in *reducing prices.* That the Government have not hitherto realised this, and have failed to appreciate that the interests of Government and plumbago consumers are identical, is, I consider, Sir, a subject of serious regret. The dry logic of facts, in the form of diminished exports of Ceylon plumbago, will, however, inevitably prove it in time.—I am, &c.,

BASIL E. PETO,

(Morgan Crucible Company, Limited, London.)

Colombo, February 11th.

RUBBER AND GUTTA-PERCHA.

East Africa.—An interesting discovery has recently been made that the fruit of a tree which grows principally at Dunga will on being tapped with a knife produce a white fluid, which when placed in boiling water coagulates into a substance closely resembling gutta-percha ; this in the process of cooling becomes hard, but can in its previous soft state be moulded into any required shape. The fruit somewhat resembles a peach in shape, but is of the size of a small melon. It was intended that samples of this product should be taken to London, and doubtless by this time expert opinion has decided whether it is actually gutta-percha or not. It is not improbable that it will prove to be an inferior order of that article. Should it be found to be worth anything, however, a large source of revenue may be derived from it, particularly if, as is quite likely to be the case, it is discovered in the sister island and upon the mainland.—*Central African Times.*

WYNAAD PLANTING NOTES.

WYNAAD, Feb. 13—The coffee spike is so well developed upon bushes which yielded only a light crop recently that the recent showery weather, if succeeded by more wet within a reasonable time, will open and set an excellent blossom. A considerable amount of pruning has already been accomplished, but this work will prove more costly and tedious than in 1900, as the quantity of old wood, from the heavy crops borne by estates, is necessarily larger than in the preceding season.

A weeding on weedy estates, if carefully accomplished after the termination of coffee crop work, is a judicious means of keeping down expenditure in weeding during the May and June ensuing, as the weeds do not, in such instances, require further attention till July ; and this leaves labour available in the two earlier months for burning borer stumps, handling, and supply pitting. A hot weather weeding, (on weedy estates,) if undertaken in February–March, can be finished for R2 per acre, especially where much local labour is to the fore for the operation. Where funds are available, in addition to the weeding, a light forking and the application of bulky fertilisers is also progressing, and by the end of March nearly the whole of such important operations should have been concluded and low country labour discharged, before the Vishoo festival, generally held early in April.

South Indian planters have every need to be buoyed up by the assurances and views of such as hold optimistic theories regarding the future prospects of coffee and tea, for a prominent London merchant, largely interested in such industries, as well as in Ceylon tea gardens, writing under date the 18th ultimo. holds that " we have a bad time before us which will not be improved by our dear friends the French putting 10d. per lb. duty on East Indian coffee, and letting Brazil in at about 2½d. The only hope is that I cannot conceive anyone drinking Brazil coffee who has ever tasted anything beter, and yet 70,000,000 of Americans drink it ; but then their state of civilisation is inferior in all matters of taste."—*Madras Mail.*

INSECT PESTS.

Planters will be interested to learn that Mr. De Niceville, the newly appointed entomologist of the Indian Museum, will spend several months each year on tour, for the purpose of investigating insect pests wherever they occur. He will also deliver a course of lectures annually at Dehra Dun.—*Indian Agriculturist.*

GUTTA-PERCHA.—The exports from Singapore are shown by the following figures to have swollen considerably in the last decade, and those who look with anxiety to the continuance of the supply will be seen to have cause for their disquietude :

1891	7,013,440 lb
1897	6,437,733 ,,
1899	16,178,133 ,,

These figures are certainly somewhat startling in more than one respect, and no doubt the Pacific Cable scheme has had a good deal to do with the conversion of a decrease into such a large increase. How long the producing districts can stand the train is a speculative matter of great importance, and it is regrettable that the system of gathering by natives, as practised in Borneo, cannot be effectively controlled by responsible persons. As things are at present, the natives do pretty much as they like, and there seems to be no way of enforcing the regulations as to cutting down trees which have been issued by the Governor of British North Borneo. We are promised a supply of gutta-percha in the future from French and German colonies where transplanting is being carried out, but it will probably be some time before supplies from the new sources affect the Singapore market —if, indeed, they ever do so. Still, what is being done by France and Germany is worthy of all praise, and our own Government might do well to take some decided action in the matter. Seeing how little success has attended the various schemes for the preparation of gutta-percha from the leaves of the tree, it is somewhat surprising that an attempt was recently made to form a new company for this object. Whether the promoters have succeeded I do not know, but cautious investors will surely take warning by what has occurred in the case of a large London company on the prospectus of which the names of distinguished scientists occurred. There seems to be a great difficulty in getting regular consignments of leaves to Europe, and the idea of successfully working the extraction process on the spot in the fore s is scouted by men who are familiar with the country.—*Gutta-Percha Trades' Journal* Jan. 21.

RUANWELLA TEA COMPANY.

THE REPORT.

The report of the directors was submitted as follows :—

ACREAGE.

Tea in full bearing	... ..	358
Tea in partial bearing..	..	16
Jungle and Waste land..	..	199
Total	...	573

year.

The crop secured amounted to 167,125 lb., being 12,875 lb. short of the estimate. The average nett price realized was 27·72 cents per lb., a drop of 6·94 cents per lb. on last year's prices shared by most other estates in Ceylon situated in the low country.

After providing a moderate sum for the depreciation of buildings and machinery, and setting aside R1,000 for doubtful Coast Advances, the profit for the year amounted to R2,073·62, to which has to be added the sum of R73·67, the under-estimated value of tea unsold of the 1899 crop, and the balance of last year's account amounting to R4,635·73. The total now available therefore is R6,783·02, which in the present very uncertain state of the tea market the Directors recommend carrying forward to the current season's account.

The crop estimated for this year is 200,000 lb. tea on an expenditure of R15,851·09, in which is included a sum of R5,828 for manuring.

During the year under review Mr. G H Alston resigned his seat on the Board on leaving the island, and the Hon. Mr. W H Figg was appointed in his place. Mr. Melville White now retires from the Board in accordance with the article of Association, and being about to leave Ceylon does not offer himself for re-election.

The appointmnent of an Auditor for the current year rests with the meeting.

KIRKLEES ESTATE COMPANY.

THE REPORT.

The report of the directors was submitted as follows and adopted on the motion of the CHAIRMAN seconded by Mr. ARMITAGE OGDEN.

ACREAGE.

31st December, 1900.

Tea in full bearing ...	...	310 acres.
Do partial bearing	...	70 ,,
Tea not in bearing ...	...	58 ,,
Timber and Cardamoms, about	...	122 ,,
Uncultivated Land ...	...	157 ,,
Total	...	717 acres.

The Directors have now to present to the Shareholders the Accounts of the Company for the past year.

The crop secured amounted to 148,682 lb. Tea (including 4,526 lb. made from purchased leaf) 1,183 lb. Cardamoms and 19 bushels of Coffee. The prize realized for the Tea was 33·49 cents per lb. as against 39·80 cents per lb. in 1899, whilo the Cardamoms sold for Re1·32 per lb. nett, as against Re1·49 in tho previous year.

The Directors much regret the very disappointing prices realized for the Tea crop, and having provided extra withering accommodation trust that prices for this year will be more in proportion to what might be expected from a district favourable for the growth and manufacturo of good Tea.

After making provision for depreciation of Buildings and Machinery and paying the interest on Preference Shares, the profit for the past year amounted to R2,558·23, equal to 2·55 per cent on the Capital of the Company. To this has to be added the balance brought forward from last year, making a total of R3,625·45 at credit of Profit and Loss Account. This sum the Directors recommend carrying forward to the current season's account.

The estimates for this year are 160,000 lb. Tea and 2,000 lb. Cardamoms, on an expenditure of R44,465.

In terms of the Articles of Association Mr. Jno. Gordon now retires from the Board, but is eligible for re-election.

The appointment of an Auditor for the current year rests with the Meeting.

THE TALGASWELA TEA COMPANY OF CEYLON, LIMITED.

THE REPORT.

The report was adopted on the motion of the CHAIRMAN seconded by Mr. CHRISTE.

ACREAGE.

	Acres.
Tea in full bearing	455
Abandoned	135
Cinnamon and Tea abandoned	43
Ravines	113
Forest boundary belts	53
Forest	1229
Total Acreage	2028

Acreage.—Under instructions from the shareholders a detailed survey of the tea has been taken and the above figures represent the actual area, of the estate in cultivation.

The Directors beg to lay before the Shareholders their Thirteenth Annual Report, with a duly audited statement of the Company's affairs to the 31st December, 1900.

The yield for the year was 195,243 lb including purchased leaf and tea sold locally at an average of cents 28·63.

Mr. R Morrison last visited the estate on 18th Jan. and reports that the general improvement of the tea bushes and condition of the estate during the past season is most satisfactory.

The expenditure on manure was R6 000, and is debited to crop account. After paying for this and putting all machinery in thorough order, and writing off the usual depreciation on buildings and machinery, the balance at credit of profit and loss account is R4,991·31 ; out of this the directors propose paying a dividend of 2 per cent per annum, which will absorb R4,000, leaving R991·31 to be carried forward to 1901.

The crop estimate for coming season is 170,000 lb and expenditure during coming season will be kept down as far as possible.

Messrs. J A Henderson and J G Russell resigned their seats on the board when they left for England. and Messrs. Hector Van Cuylenburg and W Rae Sands were elected in their stead.

Mr. W Rae Sands retires by rotation and offers himself for re-election.

The appointment of an Auditor has to be made.

COLOMBO TEA TRADERS' ASSOCIATION.

THE ANNUAL REPORT.

The annual report was then submitted as follows :—

Your committee have now pleasure in presenting their Report for the year 1900.

TEA PACKAGES.—The subject of Tea Packages has again occupied the attention of this Association, which sought the advice of Mr. A. F. Broun, Conservator of Forests, and his Assistant, Mr. F. Lewis. An exhaustive and interesting Report by the latter gentleman upon Ceylon woods suitable for toa boxes, for which the Committee herewith acknowledge their indebtedness, has been printed and circulated amongst members, and a Special Sub-Committee has recently been appointed to report further on this matter.

TEA LEAD.—Severe complaints reached the Committee last October with regard to the inferior tea lead being largely used in packages offered for local sale. The interests of trade were finally protected by a new Rule passed at a Special General Meeting held on the 16th November last, providing that all teas in packages weighing gross over 28 lb. and packed in lead under 4 oz. shall be so declared by the Selling Broker before selling. This rule came into force on the 1st January.

TEA SALES.—Some confusion having arisen on one occasion through the sale having taken place at 10-30 a.m. instead of 11-30, without apparently the knowledge of the entire trade, your Committee recommended that in future it shall be understood that tea sales are held on each Wednesday at 11-30 a.m. except the first sale after a Tea Trade Holiday, when the time shall be 10-30 a.m. This is now recognized as a custom of the Trade.

AUSTRALIAN FREIGHT.—Much dissatisfaction has been felt for a long time amongst Buyers at the scarcity of tea freight to Australian Ports, and this was intensified by the subsequent raising of freights by all mail steamship lines from R40 to R50 per shipping ton. A Special Sub-Committee was appointed to report upon the subject, and its recommendations were forwarded to the local Agents of the mail steamship lines. Your Commitaee regret to state that no relief has so far been afforded to shippers, though the arrival of a few outside steamers quoting R40 per shipping ton is a satisfactory feature.

GREEN TEAS.—The unsatisfactory state of the black tea market together with the bonus offered to makers of Green teas has caused a very considerable growth in the offerings of these kinds. In order to prevent the bonus fostering the making of inferior teas, a Special Committee was appointed by the "Thirty Committee" under the auspices of your Association to arrange a standard of quality below which no tea would be entitled to receive the special bonus. A standard was agreed to and the grant is to paid ont any teas not passed.

INFERIOR TEAS.—Several complaints of shipments of inferior tea both to London and Australia have reached your Committee during the past year, and attempts have been made to trace them to their original shippers, and through them to the estates, the chief offenders, but so far without success.

The total exports for the year were, as per Chamber of Commerce Returns :—

	1900.	1899.
United Kingdom ..	113,760,193	103,948,124
Australia ..	17,606,912	15,606,833
Russia ..	8,917,185	3,949,740
America ..	3,980,680	3,080,002
Other Countries ..	4,166,669	3,309,457
Totals ..	148,431,639	129,894,156

Totals for 1898 and 1897 :—

1898 ..	119,769,071
1897 ..	116,054,567

The following figures show the quantity offered locally in public sale for the last four years, with the average price obtained for complete invoices sold:—

	lb.	Average cents.
1897 ..	33,886,809	37
1898 ..	35,958,819	35
1899 ...	38,377,318	38
1900 ..	47,681,826	34

The following is the Committee for 1900 :—

THE CHAIRMAN OF THE CHAMBER OF COMMERCE.

BUYERS.—Messrs. Tarrant, Henderson and Company, Messrs. Finlay Muir and Company. Mr. F F Street, S J Tokmakoff.

SELLERS.—Messrs. Whittall and Company, Bosanquet and Company, J M Robertson and Company, Geo. Steuart and Company.

The number of members belonging to the Association is 42, against 43 in the previous year.

The accounts for the past year made up to 31s December, 1900, and submitted to you shew a credi balance of R1,387·61

PLANTING NOTES.

RUBBER-PLANTING has gone ahead in the Kalutara district during the past year, and much of certain tea plantations has been covered with it. Enemies abound, however, in cattle and especially porcupines, for which as much reward as R5 a head is offered.

INTRODUCTION OF TROUT INTO KASHMIR.—A very interesting account of the one experiment made so far, to introduce trout into Kashmir, is given in a recent issue of the *Pioneer*. The preparations were wonderfully elaborate and complete; but as usual the fault lay at the other end, and the recent attempt failed.

BRITISH CENTRAL AFRICA.—"H.B." sends us another useful and chatty letter on the subject of life and prospects in British Central Africa, He is certainly able to present us with several names and residential terms which stand to the credit of the white population there, but in contrast with this we have a comparatively large obituary list, for a brief period, in a paragraph quoted elsewhere from a Central African paper. Nevertheless it is plain that the country has a future before it and that as the land becomes opened up—we hope by the way, to see a B.C.A. railway sanctioned before long—the life of the white man in this fertile territory will be rendered more popular for intending colonists by increased comfort and safety in its conditions.

COFFEE WITHOUT CAFFEINE.—At the last meeting of the Paris Academy of Sciences an interesting paper was read by M. Duclaux on "The Chemical Composition of a Coffee of the Grande Comore," the results of experiments by M. Gabriel Bertrand, of the Pasteur Institute. It appears that this coffee grows in a wild state in an island off the coast of Africa, where it was found by the explorer Humboldt, and is signalised on account of of the peculiar fact that it does not contain the slightest trace of caffeine, to which ordinary coffee owes its excitant properties. One quality of this coffee is, therefore, that it can be taken as an after-dinner beverage at night without any fear of in insomnia. Referring to it from a scientic point of view, Mr. Bertrand drew attention to the fact that well-known Botanists, such as Professor Frœhner of Berlin, and Professor Baillon of Paris, have not been able to agree as to the specific nature of this coffee. The French Botanist holds that it belongs simply to the same species as ordinary coffee, *Coffea Arabica*, while his German colleague treats it as a new species, and gives it the name of *Coffee Humboldtiana*. As a matter of fact, the botanical characteristics are practically identical with ordinary coffee, but there is a distinct difference in the chemical composition. This is not apparently due to any difference of soil or climate, as an analysis of *Coffee Arabica* cultivated on the Island shows it to contain 13 grammes of caffeine per kilo. M. Bertrand is of opinion that the subject opens a new field of study to biologists.—*Chemist and Druggist*, Feb. 2.

CULTIVATION OF TEA IN THE UNITED STATES.

(*The London Times*, Monday, Feb. 4.)

The possibilities of tea production in the United States cannot fail to be of considerable importance to those who are interested in the tea industry in various parts of the British Empire; in India, Ceylon, and Natal for example. In his recently issued annual report, the American Minister of Agriculture takes a hopeful view of the prospects of tea cultivation in the United States. It appears that for several years Dr. Charles U Shepard, of Summerville, South Carolina, has been experimenting with a view of obtaining information as to the practicability of producing American tea, and his efforts promised so much of value that it seemed proper for the Department of Agriculture to render assistance. To this end arrangements were made with Dr. Shepard, whereby certain machinery, &c., were to be furnished in order to settle some questions pertaining to the commercial production of tea. Throughout the work the question of labour has been an important one; but through Dr. Shephard's efforts there has been adopted a method for utilising the labour of colored children. What he has accomplished in this matter in his region could undoubtedly be brought about in other sections of the south, where much idle labour is awaiting proper utilisation. He has established schools on his place, and in these the children are received and educated, and at the same time are taught to pluck tea and perform other work in connection with the production of the crop. For such work fair wages are paid, and in this way interest is maintained. The experiments have shown that tea may be produced in the United States in two ways:—1. By families in their gardens, as was demonstrated years ago to be entirely feasible; and (2) on a commercial scale after the manner followed by the British East Indian tea establishments and the beet sugar industry. The work at Summerville was started with a view of ascertaining whether, under favourable conditions, tea plantations could be made to yield as much as the average Oriental production, and whether the crop could be marketed at a fair profit. The results obtained have been affirmative; the crop of 1900, although not so large as expected early in the season, exceeding that of any previous year by at least 12 per cent, and the entire product being sold before it was all gathered to a prominent Northern distributing house at a price that gave a fair profit. As further evidence that tea can be profitably grown in the United States capitalists are already making preparations to begin the work in certain parts of the South on a more or less extensive scale. It has so far been shown that a good grade of tea can be grown and put on the market in bulk at a cost not exceeding 15c per lb. Under average conditions an acre will yield 400 lb. of marketable tea, and this at 15c per lb. would make the expense of growing it $60 per acre. The tea should sell in bulk for at least 30c per lb. and the profit on this basis would be 100 per cent. Besides the cost of marketing, however, there are other expenses to be considered, such as the salary of a superintendent and the interest of the money invested in the plant, which would, of course, cut down the profits.

From considerations such as the foregoing it is inferred that the commercial possibilities of tea production in the United States can no longer be questioned, but there are still many points to be settled, especially as regards the improvement of the product. During last year experiments were undertaken for the purpose of determining the effect of irrigation on tea, and also the effect of shading the plants from the direct rays of the sun. Work has likewise been inaugurated with a view of reducing the cost of the preparation of tea, especially the green tea. The experiments in irrigating and shading, which will be continued, have given promising results, the shaded plants affording nearly double the yield of the unshaded, and a much finer grade of leaf. In the future special attention will be given to the manufacture of pure green tea. This subject is now receiving the notice of both inventors and planters in the British Colonies, as they begin to realise the hopelessness of bringing American tea drinkers to use the black tea instead of the green. The manufacture of green tea in the United States can be made successful only by the invention of machinery which shall take the place of expensive hand labour and prevent the waste which accompanies the latter. These questions are all being investigated by the Department of Agriculture, and in addition, it is giving special attention to a study of the conditions in various parts of the South with reference to determining the localities where tea can be grown to best advantage. Experiments have been inaugurated by some of the experiment stations and plants distributed with a view of putting the work on a substantial basis. Much need is felt for young men capable of taking up this important problem, and the subject is especially commended to the notice of the agricultural colleges in the Southern States.

[Dr. Shepard is certainly making a stir; but all the same it is impossible he can compete, commercially, with the cheap labour and teas of Ceylon and India.—ED. *T.A.*]

RAW RUBBER AT BULL WHARF.—We are enabled, by the courtesy of the proprietors of Bull Wharf, to give two illustrations of the method of sampling india-rubber and gutta-percha for the market. The crude material arrives at this wharf, which is one of the most important in the rubber trade, from all parts of the world, and a consignment very often includes a large variety of qualities. These have first to be unpacked and classified; the packages are then tared, and an average sample of each parcel is taken and forwarded to the selling brokers. The firm having been for many years connected with this branch of the Rubber Trade, and having on their staff men who have been used to the work all their lives, they at once appreciate the various points connected with the quality and different features possessed by each package, so that they can at once classify them according to their market value. In dealing with materials like india-rubber and gutta-percha, which have such very varied appearance, and can be adulterated in so many ways, it is important that this work should be done by men who thoroughly understand their work. The staff know approximately what a package should weigh, and if it is either too heavy or too light they would guess that something was wrong, and would immediately investigate the cause, and consequently place the package in a different class to that which its ordinary denomination might entitle it to.—*Gutta-Percha Trades' Journal*, Jan. 21,

THE "TEA" PROBLEM: THE VIEWS OF THE LONDON BROKERS:

"SWEET CLEAN CEYLON PEKOE SOUCHONGS" SELLING FOR 3¼D.—AND "NOW IS THE TIME TO PAY ATTENTION TO CHINA TEA"!?

WHY ARE AMERICA AND EUROPE NOT SWEPT CLEAN OF CHINA-JAPAN TEAS—WITH "SWEET CLEAN CEYLONS" SELLING AT 3¼D. PER LB.?

"In the multitude of counsellors there is safety"; and surely if the scriptural adage be true, the position of the tea-planters of Ceylon ought to be safe enough! For, apart from the prolonged discussion before and at the Planters' and Merchants' annual meetings, our Correspondence columns shew that there is no abatement in the interest felt in the subject or in the varied advice tendered to the tea-grower. The latest letter of importance comes from a gentleman, who mentions that he has had residence and experience in China to guide him and whose name and firm will be recognised as connected with some very extensive tea interests in Ceylon. The gist of the warning tendered by Mr. M. P. Evans is that the growing inferiority of Indian and Ceylon tea, if continued, is bound to encourage a revival of the China tea trade with the United Kingdom; and, secondly, that in "going for quantity" without caring about quality, Ceylon planters, or certain of them, have taken the surest step to ruin the reputation of their teas and to injure fatally the trade in the same. Now, with *very few* exceptions ("the black sheep" who may be found in every large community) Ceylon planters do not mean this year to go for "quantity" at the expense of "quality." The universal determination, we believe, is to "pluck fine" and to turn out better teas; and if the same is done in India, we may be sure that the overplus of common teas will soon disappear. But why is it that our London friends and advisers do not confess that much of the blame for the deplorable state of things during 1900, lay at the doors of the London tea trade. How long ago was it—during 1899?—that we had the commoner grades of tea so much in demand, that the prices closely approximated to those paid for the higher, that is for the fine teas, and this continued so long that, of course, it set the mass of producers to go in for the very policy of "quantity" latterly condemned. Now, we are bound to have the other "swing of the pendulum," and we shall see how long it will be before there is a cry at home of "too much fine tea"? But is the mass of the Ceylon tea that has been selling in London of late at 3d to 4d per lb. mere "rubbish"? We have good reason to doubt this; and here is our authority in the report of a London Broking Firm who must know what they are writing about—note the sentence we have italicized:—

I. A. RUCKER & BENCRAFT'S WEEKLY TEA CIRCULAR.

LONDON, THURSDAY EVENING, FEBRUARY 7TH, 1901.

TEA.—CEYLON—Deliveries for January shew an increase of one million pounds over those of same month last year, but as Imports were very large, we are carrying a stock of 28 millions against 21 millions. As the Indian stocks are nearly 75 millions compared with 63 millions, the position is adverse to price, and we are now lower than ever.

The market feels the weight of common tea, which is now at about 3¼d *for clean sweet Pekoe Souchongs with fair leaf, such as were selling at 6½d per lb. same time in 1900.*

Ceylon Tea is really not doing so badly as Indian, as deliveries in the past eight months have increased by four millions of pounds, while those of Indian Tea are less by nine millions. Very heavy clearances of both kinds are being made, in prospect of a further increase in the Duty.

In the first three working days of February 4,327,000 lb. all kinds were cleared against 2,200,000 lb. last year

Now, here we have a most important admission, and we want to know from tea authorities, both here and at home, why it is with "clean sweet Pekoe Souchongs with fair leaf" selling at 3¼d, there is (1) a single million of lb. of China tea wanted in the London market; (2) why the American market for "black teas" is not swept clear of Chinas and Japans from the Atlantic to the Pacific Coast. [Some years ago we were constantly assured that only the high price prevented Ceylon's superseding Chinas and Japans in America; that the importers and dealers could not get their profits out of 6d to 9d teas. Well now can our "sweet pekoe souchongs" ever be cheaper than 3¼d and why does Commissioner Mackenzie not report that they are clearing out the black teas of the China-Japs? It is all very well to divert attention by crying up "green teas"; but after all America consumes *more* black than it does of green tea and now or never should be the time to get the dealers and drinkers accustomed to the "clean, sweet," cheap machine-made teas of Ceylon. Is the "Thirty Committee" awake to the fact and should not their Agent be even now in New York urging this new phase on the dealers' attention?—That we should have here a splendid opportunity for winning the Continent of Europe is equally true.] But (3) we have to ask, how it is that another London Broking Firm—Messrs. St Rucker, Marshall & Co.—on the same date, 7th Feb, urge on the Trade, that now (with "clean sweet P.S.'s" at 3¼d) is the time to pay more attention to China tea! Here is their report:—

LONDON, E. C., 7th February, 1901.—Business during the past month has been exceptionally quiet, prices for all descriptions showing a heavy decline; the large quantity of Indian and Ceylon Teas offered at public auction, combined with the heavy duty payments made owing to the fear that the Chancellor of the Exchequer may again increase the Tea Duty, has tended to depress the China Trade more and more, neither the Dealers nor Shippers showing the slightest inclination to buy, even at the exceedingly low prices now ruling. In our opinion the Trade would do well to pay rather more attention to China Tea, as in all probability they will never have such an excellent opportunity of securing such good value again.

CEYLON.—During the past month the market for Ceylon Tea has been very irregular. Up to the middle of January it remained fairly steady, when owing to the large quantities brought to auction prices fell away all round, especially for common sorts. Common Pekoe Souchongs have been sold as low as 3¼d per lb., and common Pekoes at 3¾d to 4d per lb. The export trade is quiet. During January 148,520 packages

were brought to auction, and realised the average price of 6⅝d per lb.

Verily, the puzzles of the Tea Trade are interminable: just as we might expect China tea to disappear with our own clean sweet leaf down to 3¼d, sharp city men in the trade, say "Now is the time to pay attention to Chinas." What does it mean?

Next for some more counsel to our planters which we find this time in—

McMEEKIN & CO.'S NOTES ON INDIAN AND CEYLON TEAS, MONTH OF JAN. 1901.

Indirectly the business of the Tea trade has been seriously affected by the war in South Africa. The derangements caused by the large clearance prior to the production of last year's Budget, and by the imposition then of an extra Duty were not fully overcome when another movement to pay Duty in anticipation of this year's Budget set in. During January, the total of the Duty paid on all Tea was £740,000, while the monthly average for 1900, (taking the whole at 6d per lb) was only £520,000. Consequently, £220,000 of the available capital resources of the trade is now locked up in Duties beyond current requirements, and, in addition to that the whole value of the Tea has had to be paid over to the Importers in order to clear it from Bond, as now required by His Majesty's Customs, this would absorb about £250,000 more. The lock-up in question is doubtless responsible for some failling off in the activity of the demand towards the close of the month.

The proposal to restrict output has been seriously taken up by most of the larger producers of both Indian and Ceylon Tea, and if the scheme suggested is carried out there should soon be little excess beyond reasonable requirements to deal with. It is to be hoped that production will not be cut down too much, as anything approaching to inadequate supplies would certainly lead to speculative dealings, which have always proved bad for the trade.

Not only may speculation set in at home if Indian and Ceylon shipments fall off much; but are not China and Java exports to London bound to increase? The really great cloud overshadowing the future in our opinion lies in the area of young tea coming into bearing, especially in India—11,000 acres in one block on the "Kanan Devan" property in North Travancore; 2,000 acres more in Travancore proper and perhaps between 20,000 and 25,000 acres of tea in Northern India on well-selected soil. On the other hand, many gardens in the poorer parts of Sylhet and other Indian districts must contract their plucking area, and this leads us to consider the case of our older and poorer estates in Ceylon. Well does a London merchant (with no personal interest. we believe, in such poor old estates) write to us by this mail with reference to the "survival of the fittest" theory:—

"Terrible times for tea growers. Combination is not philanthropy and the retention in cultivation of the poorer estates is the safety of those less poor. If poor places shut up there is plenty of good land to be had in India!"

Here is another risk before Ceylon; but surely no capitalist will be so foolish as to put money in opening more tea land during the next three or four years? The supporters of the "10 per cent reduction of area" plan allege that it gives great security against any tea-planting extension; but all the same, we are not convinced that it must be the duty of every proprietor in Ceylon to subscribe to this plan. As we have already indicated, we should like to see tea estate proprietors have an option between the following answers (to the P. A. circular) or something like them:—

(1) We, or I, agree to abandon for the year 1901 one-tenth of my plucking area;—or

(2) I agree to make one-tenth of my output into green tea, in place of reducing plucking extent;—or

(3) I cannot consent to reduce plucking area; but I guarantee that my estate sends one-tenth less outturn or crop into the market during 1901 than in 1900;—or

(4) Inasmuch as my estate gave no more crop in 1900 than in 1899 and therefore did not contribute to the overproduction, I cannot agree to any one of the above proposals. but intend to pluck carefully and get no more than an average crop during 1901.

Surely if the above programme, were universally adopted—that is, if one or other of the answers were sent in, signed and honorably maintained—the object in view as regards "combination" and a reduction in production, especially of common teas, would be attained.

As to Mr. Robert H. Elliot's "currency" remedy, we are quite with him in realizing the great benefit of a cheaper rupee, to producers and exporters; but what about the dislocation of Banking, Trade and Revenue? Is there the slightest chance of reversing a Currency policy so deliberately arrived at, and which from the point of view of the official, the banker and the merchant, has given such special satisfaction? If Mr. Elliot thinks there is, he will agree that the agitation should begin and be mainly carried on by Indian exporters, as little Ceylon is but as "the fly on the wheel" when compared with the exporting interests of all India.

A NEW CEYLON TEA COMPANY.

The *Investors' Guardian* (of Feb. 9.) has the following details of a new undertaking:—

Kobonella Estates Company of Ceylon, Limited, (69,280).—Registered January 29th, with a capital of £30,000, in 1,200 preferred shares of £10 each and 18,000 ordinary shares of £1 each to acquire the four estates known as Deanstone, Kobonella, Horakanda and Meenagella, in the Central province of Ceylon, to adopt an agreement with J Greig and others and carry on the business of planters, farmers, graziers, cultivators and growers of tea, coffee, cardamoms, cocoa and other crops, miners, merchants, ship-owners, agents, etc. The subscribers are:—

	Shares.
J R Hughes, 30, Mincing Lane, E.C., Merchant	500
E B Smith, The Cedars, Norwood, Gentleman, Director of Balmoral Estates Company.	500
E S Anderson, Oak Bank, Elgin, Planter.	500
T J Anderson, Dunster House, Mincing Lane, E.C., Tea Share Broker.	1
J N Layton, 30 Mincing Lane, E.C., Tea Broker.	1
E J Young. 9, Fenchurch Av. E.C., Planter	50
E J House, 66, Old Broad Street, E.C., Clerk.	1

Minimum subscription (if any shares offered to public) 450 preference and 9,500 ordinary shares. The number of directors is not to be less than 2 nor more than 4; the first are E S Anderson, J R Hughes and E Bowden-Smith; qualification £500; remuneration £50 per annum. Registered office, 66, Old Broad Street, E.C.

NEBODA TEA CO., OF CEYLON LIMITED

THE REPORT

was submitted as follows :—

ACREAGE.

Tea in full bearing	..	231 acres.
„ in partial bearing	..	152 „
„ not in bearing	..	112 „
Total Tea	..	495 acres.
Forest land, &c.	..	240 „
Total	..	735 acres.

The Directors submit their Report and Accounts for the year ending 31st December, 1900.

The Crop secured for the year was 194,600 lb., and was sold in Colombo at an average rate of cts. 28·82 per lb., as against 35·09 for 1899. The cost of production, including manuring, was cts. 22,176.

Allowing for area pruned during the year, the Tea in full bearing has maintained the yield of the previous year.

The estimate for 1901 of 200,000 lb. made Tea is based upon the finer plucking already adopted. Compared to previous style of plucking this will effect a reduction of 20 per cent. in yield.

The Directors recommend that the 69 acres purchased last year for fuel be sold, as the completion of the cart road to Neboda renders the ample forest reserve there available for firewood.

The balance at credit of Profit and Loss Account was R13,609·63 which sum the Directors recommend should be disposed of as follows—to place R13,250 to credit of Reserve Account as a set-off against Capital Expenditure for the year, and to carry forward the balance.

In terms of the Articles of Association, Mr. Joseph Fraser retires from the Board, but is eligible for re-election.

The Meeting will appoint an Auditor for the current year.

KANAPEDIWATTE TEA COMPANY.

THE REPORT

The Directors beg to lay before the shareholders their report and accounts for the year ended 31st December, 1900, which they regret are not so satisfactory as in past years.

The usual table shewing the crop, cost and average of the tea for the past three years is attached for comparison.

1898.

	Crop in lb.	Cost in Colombo.	Nett Average.
From Estate Leaf..	142,267	23·11	32·71
From Bought Leaf..	30,330		
	172,597		

1899.

	Crop in lb.	Cost in Colombo.	Nett Average.
From Estate Leaf..	151,030	21·92	36·16
From Bought Leaf..	38,565		
	189,595		

1900.

	Crop in lb.	Cost in Colombo.	Nett Average.
From Estate Leaf..	151,121	2,407	27·72
From Bought Leaf.	52,195		
	203,316		

It may be mentioned that the estate tea by itself cost cts. 23·89 as against cts. 19·94 in 1899 and cts. 20·52 in 1898.

It must be borne in mind, however, that applications of manure cost cts. 1·39 per lb. of estate tea this year, or cts. 1·24 more than in 1899.

The crop was 13,879 lb. short of the estimate, which was in great measure due to abnormal rainfall in July, August and September.

The nett profits for the year amount to R20,065·98, which is equal to six per cent on the paid up capital of the company, as against 13 2-5ths per cent in 1899 and 12 per cent in 1898.

A sum of R660·70 has been written off for coast advances, which unfortunately could not be recovered, leaving a sum available for distribution, after adding the balance brought forward from last year, namely R480·39, of R19,885·67. Of this sum R6,680 was absorbed by the payment of an interim dividend to the 30th June last of two per cent, and the Directors leave it to the meeting to decide what dividend shall be declared out of the available balance R13,205·67.

In February last, Mr. Geo. Christie, one of the Directors (and also Manager of the properties of the Company) resigned his seat on the Board to proceed to England, and Messrs. W P Metcalfe and E M Shattock were appointed to act temporarily in his place.

He has now resumed charge of the estates and taken up his old position on the Board as a Director.

In terms of the articles of Association Mr. W Kingsbury resigns his seat on the Directorate, but is eligible for re-election.

The Auditor, Mr. J D Forbes, offers his services for 1901.

The report was adopted.

THE KELANI TEA GARDEN CO., LD.

THE REPORT.

ACREAGE.

282	Acres	Tea in full bearing		
52	„	„	planted	1896
30	„	„	„	1897
34	„	„	„	1898
10	„	„	„	1899
14	„	„	„	19.0
422	„			
313	„	Reserve		
11	„	Ravines, Waste and Grass		
746	Acres.			

The Directors beg to submit to the Shareholders the accounts of the Company for the year ending 31st December, 1900.

The crop secured amounted to 198,877 lb. made Tea, realizing R55,838·32 or an average price of cents 28·08 per lb., as against an expenditure exclusive of items under Capital Account of cents 20·92 per lb., including R1,843·77 spent on cost of Manure and application.

The balance at credit of Profit and Loss Account after allowing for depreciation of Buildings and Machinery is R6,319·99, which the Directors recommend should be carried forward to next account. The Directors regret the unsatisfactory result of the year's working, which may be attributed to the adverse conditions of the Tea market prevailing for low-country Teas during the latter part of the year.

The manufacture of the Tea also has been seriously interfered with during part of the year owing to alterations and extension in the Factory, but these having now been completed, better prices may reasonably be expected.

The estimate for the current season is 200,000 lb. made Tea, to be delivered into Colombo at a cost including manuring of cents 21.93 per lb.

Mr. Fred. Hadden retires from the Board in terms of the Memorandum and Articles of Association, and being about to proceed to England does not seek re-election. It is suggested that Mr. F L Clements,

who has recently been appointed Visiting Agent to Kelani Estate should be elected to fill the vacancy on the Board.

The appointment of an Auditor rests with the Meeting.

YATADERIA TEA CO., OF CEYLON, LD.

The Directors have the pleasure to submit the balance sheet and profit and loss account for the year ending 31s December, 1900, duly audited.

Including extraneous profit from outside manufacture the profit for the year is R43,575·04 to which must be added R6,405·80 balance from 1899. An Interim Dividend of 12½ per cent. absorbing R23,750, was paid last August, and the Directors propose that a further Dividend at the rate of 12½ per cent. absorbing R23,750 be declared and made payable as the Directors may determine in meeting on 26th instant, leaving a balance of R2,480·84.

It will be seen that the property representing Capital stands in the Balance Sheet at approximately R197 per acre cultivated, as compared with about R197 in the previous year's accounts, and that the profit is R47·72 per acre in bearing, and 22 93 per cent, on the capital.

The total Tea crop was 643,360 lb. or 63,360 lb. more than the estimated quantity, the latter part of the year having been more favourable. The plucking area was 913 acres, in addition to which the 29 acres of 1898 tea was plucked towards the close of the year. The total quantity of Tea for disposal was 660,419 lb. including 17,059 lb. made from purchased leaf, of which 17,805 lb. were sold locally averaging 19 11 cents per lb. and 642,614 lb. were shipped in London, of which 176,342 lb had still to be accounted for; but the average obtained for the 484,077 lb as yet accounted for is 28·14 cents per lb. The cost of the Tea delivered to buyers or put on board ship, including all charges, was 18·95 cents per lb and the nett value realised from sales (a portion being estimated) was 26·43 cents per lb.

The Company's property consisted on the 31st December 1900, of;—

Acres Tea.					Tea per Acre. lb.
172	planted in	1885	yield in	1900	620
208	do	1887	do		605
100	do	1888	do		570
42	do	1889	do		968
6	do	1890	do		1,009
52	do	1891	do		1,015
120	do	1892	do		904
68	do	1894	do		697
37	do	1895	do		782
75	do	1896	do		772
33	do	1897	do		299
29	do	1898	do		62
24	do	1899	do not in bearing.		
22	Acres cocoa and Factory site.				
10	Acres cardamoms.				
255	Acres forest, &c.				

Total 1,253 Acres as per last report.
966 Acres Tea.
Average yield from 913 acres 702 lb,
The estimated crop for 1901 is 594,045 lb Tea.

Mr. V H Masefield retires from the Board, and the Shareholders will be requested to elect a Director and also an Auditor for the current year.

THE CEYLON PROVINCIAL ESTATES COMPANY, LIMITED.

THE REPORT

was submitted as follows:—

The Directors beg to present their report for the year ending 31st December, 1900, together with a statement of accounts for the same period.

The tea crop amounted to 506,207 lb. against an estimate of 455,000 lb. for the year, or an average of 562 lb. per acre from the tea in bearing.

The total profit for the year was R91,017·16. The cost of producing the tea was R24 42 cts. including R1·97 cts. expended on manuring as compared with R24·35 cts. and R1·50 cts. respectively for the previous year.

The nett selling price of the teas shews a falling-off from 1899 of R2·06 cts. per lb., the average for 1900 having been R42·56 cts. per lb. as against R44 62 cts. obtained the previous year.

Including the sum of R587·03 brought forward from last year, the profit and loss account shews, after the payment of an interim dividend of 3 per cent, interest on mortgages, bonus to Superintendents, Secretariat and other items, an available surplus of R57,426 31, which the Directors recommend being disposed of, by paying a final dividend of 6 per cent, making 9 per cent for the year and absorbing R39,960; by setting aside R10,000 towards the liquidation of one of the mortgages and by carrying forward the balance to next year after providing for Directors fees.

The estimates for the new season point to a yield of 500,000 lb. of tea costing R24·98 cts. per lb., which includes a sum equal to R2·33 cts. per lb. for manuring operations.

A fresh survey has been made of Glassaugh, and the following is the present acreage of the estates:—

	Glassaugh.		Brownlow.	
Tea in full bearing	452	acres	423	acres
,, partial bearing	20	,,	80	,,
,, not in ,,	20	,,	—	,,
Total in tea	492	,,	503	,,
Fuel trees	—	,,	2	,,
Forest	4	,,	33	,,
Grass	1	,,	27	,,
Scrub and Waste	22	,,	20	,,
Total	519	acres.	585	acres.

Mr. E S Grigson retires from the board in terms of the articles of Association, and is eligible for re-election.

The appointment of an Auditor for 1901 rests with the meeting.

PLANTING IN B. C. AFRICA.

COFFEE AND TOBACCO—OLD RESIDENTS—HEALTH—FEVER—SOIL—MONEY-MAKING—ROOM FOR MEN OF THE RIGHT STAMP—RAILWAY—COFFEE CROPS.

Mlanje, 7th Jan. 1901.

You ask me if I could name half a dozen men who have stood this climate as long as I have, and kept as good health, and if anybody has made money here. I would not go beyond this district itself to answer the first question.

Mr. A C Simpson has been over 25 years in this country, arriving with the first steamer for the Shirè, and has had various ups and downs in the Country; serving on Lakes and Rivers as engineer, trader, and latterly settled down to planting and trading in Mlanje where he has been for the past eight years or more, and has only been home twice, I believe, during all those years. A.C.S. looks as fit and as well as any man could do at the present time.

J W and Mrs. Moir of Lauderdale, who are at present at home, enjoying a trip to

the old country, have been over 20 years in Africa, and eight years in Mlanje and I can safely say they both enjoyed good health in this country.

Mr. and Mrs. Smith, of the Church of Scotland Mission, have been 12 or 14 years in Blantyre and here, and are also in good health.

Mr. and Mrs Herd of the same Mission have been nine or ten years out and are also in good health.

Mr H B Bradshaw, my neighbour, and Mr. D Ritchie have been in Mlanje nearly as long as myself, and both have only been home for a run once for a few months, and finer specimens of robust planters you could not find in any of your mountain planting districts. I need say no more in response to your query although I could name many in other districts who have been over 20 years in B.C.A. and are perfectly well at the present time.

The fact is, as I have said before, people must learn how to live in Africa as well as in other tropical climates, and those who have been long resident in B.C.A. have done so.

Now that scientific research is bringing to light so much on the subject of malaria it will soon be possible to be perfectly safe from fever in any country. Notwithstanding the mosquito theory I do not think it safe to live here without taking quinine. Mosquitoes are not numerous here in Mlanje, and *one* is only heard and seen occasionally during the rainy season, but I would not like to risk giving up taking quinine in preference to the mosquito netting. I have not had fever for five years now, and do not want to get it.

With regard to money-making in B.C.A. I know of only two planters who have left the country for good having made money at coffee-planting. Messrs J—— and D——, the former some £6,000 and the latter about £3 000. The former was only about six years here, and was fortunate in getting some 10 cwts. per acre from a coffee estate he opened up during that time, and his other investments proved good; so he sold out and has gone to S. Africa to start business in one of the coast towns.

The other was some 25 years in B C.A. but only about 10 years planting coffee, and he sold out—clearing, I was told, the above amount and is now living with Mrs. D. in Scotland.

It must be remembered that this country is young, and that the agricultural resources of the land have not yet been developed. There are few men with capital to enable them to prove what can be done with the different products which might be, and are, grown successfully here; most private planters have really got very limited means, and everybody knows what uphill work it is anywhere working under such circumstances. We all know it requires money to make money, especially quickly, so give us a chance. I can safely say, however, that there are no planters or others hard up in this country, and all seem able to make a decent living either at planting or trading or something else.

I do not believe there is a single individual out of employment in the country at the present time; and I am quite sure a few more are wanted to take up billets. So it is perhaps a good thing that the country has got such a bad name for sickness, at least it prevents us being flooded with men on the staff, especially those of the loafer stamp who are not wanted.

Any one coming here should be of good character and have sufficient means to leave the country again if need be—but it would be better still if emigrants had the means to engage in some independent industry. The transport and other firms, or companies, are all doing swimmingly well and some of them have paid dividends of 7 and 8 per cent. They have great trouble with their employees, who find when they come out here that they can better themselves, try all sorts of dodges, and do all sorts of things to get sacked; they of course, forget the fact that they were brought out by their employers, and were of little use till they learnt the language, etc. I cover the sketch of a draft prospectus which has been sent home to try and get capitalists to take up the construction of our railway. Comments on the paper I leave to yourself. It may force the hands of our newly-formed home Government to take up the matter. We have certainly more claim on the Imperial Government for a railway than Uganda has, and ours is far more likely to be a paying line.

We are going to have a very short crop in Nyassaland this year; the blossoming season was upon the whole very unfavourable, being too dry. Although we, in Mlanje began well, the latter end of the season was a scorcher, and with the dry heat came on an unusual number of spotted bug, and thrips; the latter is as bad as a severe dose of leaf disease, carrying off the leaves and killing back the branches and withering up the crop, which drops off to single berries. Fortunately this latter pest only comes with a very dry season. I never saw them in Ceylon. Our trees are now making wood fast and throwing off the thrips.

A good many planters are going in for tobacco, &c, not to have all their eggs in one basket. I have grown tobacco here for over two years now, and have at last got a market for it which pays me very well. So there may be money in the weed, if over-production does not reduce the price.

H. B.

THE EFFECT OF LIME.—Lime, though chiefly mechanical in its action, also acts chemically upon the constituents of the soil. One of the great purposes which it serves is that it sets free plant-food which would otherwise remain locked up in the soil.—*The Journal of the Jamaica Agricultural Society.*

BIG NEW SUGAR AND PAPER COMPANY.—An English company has just bought 10,000 acres of sugar lands, and will not only make sugar, but turn the bagasse into paper. The immense reclaimed sugar land areas in Florida below the frost line are now attracting foreign promoters, and with more reason even than those in Louisiana.—*New York Commercial.*

THE EXTERMINATION OF WILD ANIMALS IN INDIA.

The question which is often raised in these days, regarding the extermination of wild animals in the shooting grounds of the world, admits in India, at least, of being examined, to some extent, by the light of statistics. Statistics are proverbially capricious things to deal with, and, unfortunately the records I have at my disposal only go back to 1885, but they may help us a little. Let us commence then with that monrach of Indian big game, the tiger. The number of tigers destroyed and persons killed by tigers since 1885 is as follows:—

			Tigers destroyed.	Persons killed.
1885	..	..	1,355	838
1886	..	..	1,464	928
1887	..	..	1,408	1,063
1888	..	..	1,473	975
1889	..	..	1,312	985
1890	..	..	1,276	798
1891	..	..	1,293	979
1892	..	..	1,323	947
1893	..	..	1,267	969
1894	..	..	1,311	864
1895	..	..	1,381	909
1896	..	..	1,502	944
1897	..	..	1,569	1,071
1898	..	..	1,257	927
1899	..	..	1,570	899

The foregoing figures, it should be observed, deal with Madras, Bombay, Bengal, the N.-W. Provinces and Oudh, the Punjab, Burmah, the Central Provinces, Assam, Coorg, Bangalore, Hyderabad Assigned Districts, and Ajmere-Merwara. They consequently furnish no *data* regarding Mysore or the Native State of Hyderabad, nor of other tiger districts, which, though not so important as the two here mentioned, must certainly be regarded as factors of great weight in influencing our general conclusion. If we break up the totals for the whole of British India into Provincial totals, we obtain the following figures:—

TIGERS DESTROYED.

Bengal	N.-W.-P. and Oudh.	Punjab.	Burmah.	C. P.	Assam.	Ajmere-Merwara.	Coorg and Bangalore.	Madras.	Bombay.	H. Assigned District.
674	83	12	83	221	347	4	9	266	122	34
245	74	4	121	253	436	4	4	209	97	17
269	99	4	120	222	438	7	9	149	72	19
376	100	1	74	315	323	6	6	203	57	12
318	83	3	76	231	337	2	12	175	49	26
275	85	—	76	208	384	2	6	150	72	18
239	106	4	87	347	377	6	12	137	49	29
256	69	5	121	274	343	—	10	150	68	27
236	73	11	133	207	367	5	6	132	82	15
271	66	3	141	361	356	1	6	141	49	16
336	77	12	152	225	360	4	6	116	54	39
361	96	15	171	323	353	—	6	105	43	29
546	121	4	173	222	387	2	3	110	22	29
292	112	1	200	262	293	2	1	102	44	48
356	108	5	233	233	411	1	5	129	51	38

The only deduction to be drawn from these figures is that from 1885 onwards there has been no apparent diminution, nothing worth speaking about, in the number of tigers available for killing. In 1885 Bengal, Madras and Bombay returned figures which they have never reached since, but in the North-West, in Burmah, in the Central Provinces, in Assam, and Assigned Districts, a full table of tigers always seems to be forthcoming. The Burmah figures are, perhaps, a little misleading. Up to 1890 the returns apparently date with Lower Burmah only; since that date the whole of Burmah has fallen under the intelligent classification of the Statistical Department. Hence these tigers! Though in Bengal 674 tigers were killed in 1885, considerable circumspection is required in dealing with this total; for the very next year, the Provincial bag dropped to 245, and indeed, from the *shikari* point of view the three years following 1885 were nothing like as good as 1897, and 1898, and 1899. It must also be insisted on that in the last three years of the series more persons were killed by tigers than in the first three, and after all said and done I suppose nobody will seriously maintain the doctrine that men should die so that tigers may be kept alive. Personally I can't see that India would be any worse off if there wasn't a tiger in the country. So far as leopards, bears, wolves, hyenas, and other wild beasts are concerned, the numbers recorded as having been killed since 1885 hardly lead to the conclusion that the stock is diminishing. Hyenas and wolves, perhaps, are the exceptions. The figures for 1885, 1886, and 1899 are here given:—

	Leopards.	Bears.	Wolves.	Hyenas.	Other wild beasts.
1885...	5,466	1,874	6,278	2,238	5,959
1886...	4,051	1,668	6,725	1,630	6,852
1899...	4,548	1,585	2,357	776	7,989

Matters far more serious for India than the extinction of beasts of prey, however much their disappearance might be made the theme of lamentations from sportsmen, are the everlasting slaughter that goes on among deer, the ruthless destruction of Indian wild birds, and the deterioration and diminution of agricultural Stock.

SAMBHUR.

—*Times of India.*

THE INDIAN TEA CROP, 1900.

In September last the Indian Tea Association gave an estimate of the outturn of the present season's crop of Indian tea showing a total of 182,144,874 lb.

The Association now give the following figures showing the actual outturn of the crop:—

			lb.
Assam	..	..	... 67,928,770
Cachar	..	..	.. 27,299,230
Sylhet	..	...	... 33,854,808
Darjiling	..	..	.. 7,474,098
Terai	...	..	.. 3,378,075
Duars	..	..	... 29,997,065
Chittagong	..	..	.. 1,065,300
Chota Nagpur	..	..	.. 185,089
Kangra Valley	..	...	... 3,000,000
Dehra Dun	...	..	.. 1,785,000
Kumaon (estimated)		..	.. 300,000
Gardens from which no returns have been received, including Private and Native gardens (estimate)	..	...	.. 11,260,000
		Total	..187,527,435

The outturn from the Duars district shows an excess of rather more than 7,000,000 lb. over the estimate of September last. This excess is, to a large extent, an apparent one only. Owing to incomplete returns it was necessary when framing the estimate to include about 5,000,000 lb. of tea under the general heading of "Gardens from which no returns have been received." This quantity has now been accounted for by the final returns from Duars gardens and is deducted from the estimate of 16,168,000 lb. for "Gardens from which no returns have been received."

Correspondence.

To the Editor.

TEA OVERPRODUCTION:—JUDICIOUS *VERSUS* INJUDICIOUS (AND "WILD") MANURING OF TEA—AND THE "RESTING" PROBLEM.

Dear Sir,—Your leading article of 21st inst. gives startling figures. I will not repeat them though they look simple enough, but I should think India will pause before agreeing with Ceylon to rest any part of her cultivated area.

17,717 tons manure means 53,151 acres of tea manured. The friend you support—on his style of working—would expect quite 200 lb. per acre as the legitimate extra quantity of tea to be produced by the application of this manure that equals 10,630,200 lb. extra tea. With the present labor supply in the country there is nothing to prevent a still larger increase in manuring operations for 1901. What is the use then of resting one portion while we go on increasing our production in this way from the remaining area. Does not above go to prove that it is not the resting of 10 per cent of our tea that is needed (any benefit from that is doubtful) but an actual reduction in output of say 10 per cent. This could be leased on the actual crop of the last two years; thus an estate averaging 100,000 lb. for the two years should undertake to put only 90,000lb. on the market leaving it to the proprietor to decide whether he would pluck finer, rest a portion, destroy his low grades, or sell to the natives of Jaffna, Trincomalee or India; just reduce as it best suits his own taste or individual estate.

In some such way only shall we get any reduction in output that will be of any help to us. Still we must support the best scheme that is brought forward so as to make a beginning and do our best to make it workable in such a way as shall benefit us all. I do not think your friend was unjustly criticized. We do not object to manuring, it is fair legitimate cultivation; but we do object to everything being taken that the bush will produce, and this at the lowest possible cost of plucking so making and throwing on the market all unnecessarily increased quantity of low class teas that are spoiling our good name and ruining our industry.

In olden days we made tea so as to get the best price obtainable, the question was not—How cheap are you plucking? or—What is your yield per acre? but—What price did you get for your last break?

If men would work now on these lines, and manure so as to keep their bushes healthy, we should not hear so much about over-production; high and low estates would each in their own line get better prices than even your highly manured old coffee land has given during the last year or two.

Here are figures from a typical old coffee estate averaging over 40 years' cultivation in that product. Not a single acre of new land has been opened for tea and it is not in a favourite district. Area in tea, 356 acres, carefully plucked and manured just sufficient to keep up the fertility of the soil.

Season	1895	1896	1897	1898	1899	1900
Total crop	184,539	182,133	173,000	169,000	175,000	185,000
Spent on manure	R1,982	2,521	2,800	2,149	1,705	2,712

Yours truly,
MANAGER.

THE "OVER-PRODUCTION" DIFFICULTY—AND HOW TO MEET IT:

[A copy of the following letter has been placed at our disposal from London.]

Brookfield, Carnoustie, N. B.,
January 21, 1901.

To the Chairman, Planters' Association of Ceylon, Kandy.

Dear Sir,—I have received copy of Mr. Rutherford's letter to yourself for which I am much obliged. The proposals for reducing our over-production of Tea are very well worthy of consideration, but are quite impracticable, unless it is absolutely certain that India joins with us, and not only joins, but does so exactly to the same extent as we do, and either by the same system as Mr. Rutherford proposes, or in such a way as will in its working show us that a *bona fide* 10 per cent reduction is being carried out by them as well as ourselves. I note that Mr. Rutherford says he has reason to believe that Indian Planters will co-operate with us; this of course must be made a certainty, otherwise they willl walk away with the enhanced price which we hope our reductions will create. I doubt very much however whether our Indian *confrères* will care to fall in with our proposals. We must call to remembrance that Indian men were growing Tea long before us, and that it is we who have done Indian planters much harm, (even though we have opened up new markets, and done such splendid advertising) by growing these enormous quantities of Tea, and not only great quantities of Tea, but poor cheap stuff, that has still more added to the harm, and to the present lamentable state of the Industry.

The greatest injury that has been done to our Industry has been caused by sacrificing quality to cheap production, and this has been done almost without exception by every individual and Company in Ceylon, and I venture to say Mr. Rutherford's own Company is in this respect as great a transgressor as any. My cure for the present poor prices is first—to improve the quality of our Tea, in every possible way, and to do so let us firstly cease to cut our trees to pieces immediately the poor coolie finds it impossible to drag 10 to 12 lb. of green leaf per day out of them: secondly, instead of asking superintendents to pluck for 7 or 8 cents give them 12 or 14 cents per lb. for this work; thirdly, never prune oftener than once in 18 months in the very worst climatic districts, and 2 to 2½ years in more favoured districts. If, as many of my friends tell me, their fields will have ceased to yield before these months have expired, then I say all the better for themselves, their trees, and the general prosperity of the Tea Industry.

Why do fields go so quickly out of yield? Simply by the bad treatment the trees get, caused by this wicked and accursed cheap working, *i.e.*, cheap plucking and pruning. My plucking used to cost 13, and often 14, cents per lb. of Tea, when many of my friends were doing it for 8 or 9 cents or even cheaper, but my profit per acre equalled

some and beat many easily. Cheap plucking means wretched quality and it acts in many ways. First, the coolie has to work so quickly that many mature leaves are missed and when the next turn to pluck them comes these leaves, instead of producing broken pekoe and pekoe, are only fit for making souchong and congou, if indeed they should not have to be discarded altogether; secondly, this cheap plucking means ripping the trees when the shoots are young and succulent, causing the trees to cease yielding much sooner than they would otherwise have done had they been more gently and carefully plucked; thirdly, to secure this cheap working, continual pruning at short intervals is done, adding fuel to the fire in the shape of poor thin weak Teas. Then this pruning must also be done cheaply, which means that the trees are hashed to pieces in the same way as a Sinhalese man cuts *varitchies* with a blunt vettu cattie.

I have only to add further that for the past eight years my prices have kept exactly 2½d above the rate for all Ceylon, with careful plucking and pruning once in two years. The yield has been over 500 lb per acre for these years and for 1900 is 530 lb. without manure. Improved quality means less quantity; the tea itself being worth more money and a less quantity being produced, our position will be thereby doubly benefited—I am yours faithfully,

ROBT. C. BOWIE.

OVERPRODUCTION—AND GIVING TEA BUSHES "REST"?

(THE BUSH MUST AYE BE GROWING AND PRODUCING FRUIT IF NOT LEAF.)

Feb 5.

SIR,—I do not believe in the recuperative effect of allowing tea bushes to remain unplucked. If they ceased to grow, it might have that effect, but as they do not, they draw nourishment from the soil, and as they grow, they become fruit bearers, and require much more nourishment, and the bigger they grow, more fruit do they produce, and naturally require much more food. Just as a cat requires more food than a mouse, and a tiger more than a cat, the larger a fruit bearing-tree is, the more it exhausts the elements that sustain it.

It is the general opinion amongst tea planters, that plucking the bushes exhausts them more or less; they think that, when a bush has been plucked continuously for twelve months or two years, and the shoots get clogged and form what are called crows' nests, and it almost ceases to flush, this is a sign of weakness, or exhaustion. I do not think it is anything of the kind. It is in my opinion simply a sign that the bush wants pruning, if you want it to flush. For when it is pruned, what happens? It grows with increased vitality, and flushes again for another couple of years, when it again calls upon the planter to prune it, if he wants it to flush. At one time, I thought that frequent pruning was injurious, but subsequent observation and reflection convinced me that it was not so.

I have seen Cinnamon bushes cut down annually for cropping purposes, for fifty years, and they grew up again with increased vitality, and these bushes, grown apparently in the poorest soil, had been treated in the same way for fifty years previously by the Dutch. Moreover I have seen yew, privet, and thorn hedges, in England, which had been cut down, and trimmed, for hundreds of years, without shewing any signs of being injured by the operation. I think, therefore, that an exhaustion of the soil, from nourishing the bush, and old age will alone diminish the vitality and flushing powers of the tea plant, after it is pruned. The longevity of the tea plant, in suitable soils and climates, is still undefined.

As an illustration of its vitality, I may mention a surprising incident within my own knowledge. In 1860 the Agent of my firm at Chittagong sent a large quantity of tea seed to Ceylon. This was planted in a nursery amidst coffee plants; the field of coffee was abandoned in 1862 and with it the nursery of tea. Twenty years afterwards the Chena—20 feet high—was felled, and burnt off, and apparently all vegetation was destroyed. With the first rains, wonderful to say, the tea shot up most luxuriantly, as if it had only been cut down, whilst all the other plants burned off were killed!

C. S.

P. S.—I have written the above, because I notice that many experienced planters talk of giving the plants *rest* by not plucking them. If they could send them to sleep thereby, like Rip Van Winkle, it might have that effect; but that sort of rest means increased exhaustion of the soil, by converting a small leaf-bearer into a large fruit-bearer.—C. S.

TEA: OVER-PRODUCTION AND ITS REMEDIES.

HOW THEY ARE AFFECTED BY CURRENCY.

Hill Grove Hotel, Coonoor, Nilgiris, Feb. 23.

SIR,—I have lately visited Bombay, Calcutta, and Madras, and I am now confident from all I have been able to hear that the Government must either sacrifice its Indian exporting industries or its currency policy; and (I say) exporting industries, because an industry like that of coal is not at present affected as it is produced and sold in silver. Were there no artificial rate of exchange the struggle between India and her industrial rivals would be determined by the relative cost of labour, and India having cheap labour would well be able to hold her own. But the Indian Government compels its producers to pay 1s 4d for a rupee while the competing countries can purchase one for 11½d. When prices were high India could still continue to struggle through under a disadvantage of about 25 per cent, but with low prices profits made either vanish or descend to a very low level. Even taking the rupee at 12½d the difference between that rate and one of 1s 4d would entail on the Indian producer a loss of £583 on every £4,000 worth of an exported article. But the producer could live on £583 per annum till better times came round. Without that sum he must starve, or at any rate approach that disagreeable condition. The ultimate point of the struggle between India and her rivals is not one of the comparative cost of labour,

but the comparative rate of exchange, *i.e.*, between the natural state of exchange enjoyed by India's rivals, and the artificial rate created by the currency policy of the Government. And this artificial rate, by much worsening the position of the producer, naturally much lessens his credit. The profits and the credit of the producers having thus been heavily attacked by the Government, the ultimate result of the contest between them and their rivals in the competing countries cannot be doubtful. I do not wish to under-estimate the value of the various expedients which the planters propose to adopt with the view of relieving the pressure of the situation, but I would represent to them that, do what they may, the ultimate result must be dominated by the artificial advantages which the Government has conferred on India's rivals. The planters then should continuously press on the Government that it must either sacrifice its currency policy or its exporting industries; for it is absolutely impossible that it can have both. The planters, too, should practically understand that to move our governing countrymen, two things are necessary:—(1) a long continuous hammering to convince their reason, and (2) a still longer steady course of representation in order to move them into action.—Obediently yours,

ROBERT H. ELLIOT.

P.S.—I think it would interest many of your readers to look at the Silver chapter in my "Gold, Sport, and Coffee-planting in Mysore" (Archibald Constable & Co.). This was written in 1893 when the Currency Act was passed. I may mention that I have no pecuniary interest in the book.—R.H.E.

II—THE SERIOUSNESS OF THE SITUATION.

5, Dowgate Hill, London E.C., 8th Feb., 1901.

SIR,—I have read with interest the various expressions of opinion that have appeared in your local press with reference to the Rutherford-Rosling and other suggestions that have been put forward with a view to help the present unfortunate position of the British tea-growing industry. The majority of correspondents are satisfied to find fault, some even make the position a subject for levity, but very few appear to realise the true gravity of the situation now, and ahead of us, and the necessity there is for organisation amongst those dependent on tea growing for their livelihood. There can be no use in asserting that but for extensions, manure, and the rest, we should all be well off. The extensions have been made, and the results to be obtained by cultivation have been proved, and what we require is a remedy that provides an effective means of controlling the over-production which already exists and promises to increase owing to these causes. Some possessing favored properties at the higher elevations are inclined to the view that the true remedy is to allow natural causes to work a cure, but I venture to think that a policy of drift will in the end prove disastrous to everyone concerned. Financial credit will be shaken. The process of killing out the weaker estates will be a long-drawn one, and before abandonment every device of cheap production will be resorted to, which must tend to breed blight and disease and bring discredit on the whole industry. We have in British-grown tea an industry which has shewn itself so far able to meet successfully all its competitors. The industry, from an agricultural point of view, is thriving and healthy in every respect, the one thing at fault is the price, and that is the one factor that we have it in our power to control.

Surely then it behoves us all to give this matter our most careful attention, to give those who bring forward schemes of relief a careful hearing, and finally to give to that scheme which seems to be the best our heartiest and most loyal support. It must be borne in mind that we have to find a remedy effective both for the protection of high and low grown interests, and acceptable both to Ceylon and India, and this may seem difficult of attainment, but it is by no means impossible if the majority are determined to work together in the matter. The tea growing industry is easy to organise in comparison with numerous other complex interests that have been brought together and now exist as examples of what can be done by organisation.—Faithfully yours,

ALFRED BROWN.

MINES AND MINING IN INDIA.

Writing to the *Journal of the Society of Arts*, Mr. W Sowerby, C.E., says :—

The coal mines are of the greatest importance. Iron mining and smelting is surrounded with great difficulties, though there are vast deposits of iron ore of every kind and very rich in metal, but the climate and labour are unsuitable. Mr Henwood's visit in 1854-5 was on the suggestion of the late Colonel Drummond to establish colonies of iron workers in the Himalyas, but the question of the fuel put a limit to that experiment. The clearances of forest were too rapid, for it takes six tons of wood to make a ton of charcoal, and two tons of the latter to make a ton of iron; so the value of the wood would be about £15 which would be the cost of the iron for fuel only. Of the greatest importance is the development of the coal-mining. Seams of coal were discoveaed at the foot of the Himalayas, but the geological superintendent, the late Dr. Oldham, and Captain (now Sir Richard) Strachey discouraged the idea of further search. There are also indications of coal in Kattyawar, also oil, which the writer of this noticed when occupied there. While in Scindh, the late Mr John Brunton, C.E., found, mined and used some coal, which was tested on the Indus steamers, but it has been entirely ignored and remains unexploited. It is stated by Dr. Evans that when Lord Curzon visited the gold mines of Mysore he was very pleased to see the work and the forty thousand labourers. What, however, is that to 250 millions to find employment for in India. The occupation of the masses must be agricultural, but on a better system than that which is now being followed. Then so far from the country being over-populated, as suggested in the discussion, double the population might be maintained. Unworked and unproved gold mines can never be correctly valued; the prices asked and obtained in 1882-3 for Indian mines was ridiculous. Gold mining is best in the hands of Government in an old country like India. In new colonies they attract emigrants, but in India no such immigration is either desirable or feasible.

THE TRAVANCORE TEA ESTATES CO., LD

The ordinary general meeting of the Travancore Tea Estates Company, Limited, was held at the offices of the company, 20, Eastcheap, on Monday last.

The chair was occupied by Mr W Mackenzie, Chairman of the company.

The Secretary (Sir William Jonston) read the notice convening the meeting.

The Chairman, in moving the adoption of the report and accounts, said—I do not think we ought to begin the business of our meeting without expressing our deep regret at the death of Her Majesty the Queen and of our sympathy with the Royal Family. Since our last report death has deprived us of the very useful services of our colleague, Mr Tod, and Mr Talbot, another of our directors, is abroad. The report and accounts you have had for some days and, unsatisfactory though they be, may, I presume, be taken as read. The crop was 128,000lb more than the previous year, because of the larger area being plucked. But for the absence of rain, which caused the Indian famine, and the excessive downfall of the last two months of our financial year August and September, when 3in fell daily on an average, the yield would have been considerably larger. In the report you are told that 1,702 acres gave 304 lb. per acre. But as you will see, one-half of that area was immature tea. For the current year the estimate from the same area is 743,000lb. I say the same area, because nothing of any consequence can be gathered this year from the 1,500 acres, more or less, planted in 1898. During the first three months of this financial year to end of December the crop from the 1,702 acres has been 49,000lb. more than for the same three months of last year. More serious even than the falling-off in crop from the bad weather has been the fall in tea prices. In the early half of the year we were doing well, and we were quite justified in paying the interest on preference shares to end of March. But the unprecedented fall which has occurred since then has upset all calculations, and has brought the average price from 7·18d in the previous year to 6·20d, a drop of ·98 of a penny per lb. The average price of Ceylon teas since June has been 7·48d, against 8·42d the previous year, and Indian tea is also all but 1d lower for same period. The yield we anticipated four years ago has been realised, except during the final months of the last financial year, when first drought, causing famine, and then an excessive rainfall lost us nearly 50,000 lb of tea. The cost of production from mature tea has been less than we expected, the price alone is responsible for our present difficulties. Another misfortune we have to record is the loss of about £2,800 in advances to native contractors. This money was given out three to four years ago, when we were preparing for the large development in acreage made in 1898. The acting manager who advanced this money has been resident in Travancore for many years, and was well acquainted with the native contractors. He was home here a year ago, and was then confident he could recover three-quarters of the money on his return. As yet, however, he has not been able to do so. This advance system is universal in the East, but is seldom attended with loss in Ceylon. In some of the great tea-producing districts of Northern India, however, it is quite understood that labour costs R100 per head for a coolie, and it is seldom that any of this is recovered. In Travancore we trust this may be our only loss under the heading. The result of the several misfortunes I have mentioned, the loss of crop from bad weather, the fall of 1d in price and the loss on these advances, is a deficiency in our resources of about £6,000. To cover this we propose to issue £7,000 of Preference shares and if your and our property is to be protected something equivalent to this is absolutely necessary. At the present moment the average price of our tea is 1¼d less than last year's average of 6 20d, and this means that it is being produced at a loss. How long this is to continue we, as directors, have no better means of forming an opinion than you have. Were it to go on for years, then it were better not to throw away more money but to allow the properties to pass to the Debenture-holders. But, pessimistic as we all are at present, I doubt whether anyone in this room really believes that prices are not to rise within a reasonable time. The laws of supply and demand will assert themselves. Planters will not go on producing 500 lb to 600 lb per acre at a loss of 1d per lb, when they can produce 400 lb of a better tea which may show no loss. The demand is increasing all over the world. The crisis has been brought on us by the great success of the tea-planting industry four to six years ago, which induced companies to open up hundreds of thousands of acres, the produce of which has swamped the market during the last two years. I might say much more in explanation of the position, and as encouragement for the future. But I refrain, as we have no wish to persuade shareholders against their convictions. I do not even wish to advise them. As directors we can merely make suggestions. It is for you to decide. But failing this scheme, the only resource known to us, short of handing over to Debenture-holders, is a reconstruction, or rather a re-arrangement, with a call on the shares. The sum we propose to raise, viz., £7,000, is what appears to us sufficient for the present. But it must be clearly understood that, with a continuance of present prices, the whole of this might be used up in paying debenture interest, and the difference between cost of production and sale prices; but such a condition of things, though we cannot, of course, say it is beyond the range of possibilities, we can only hope may not arise as the enormous tea industry of India and Ceylon would in that case also became involved in a general disaster. We show you in our report what we expect from the working of the company if our teas fetch 6½d per lb. when the land is in bearing. The price is 2d per lb. below that at which the company's teas stood when the company was formed, and if you think that is a fair and reasonable figure to assume when production and consumption have adjusted themselves, then I think you should have no hesitation in subscribing for your share of the extra capital. The matter rests entirely in your hands, however, and you must judge for yourselves. With regard to the debenture issue, I may state that when the company was formed there was not the slightest intention of issuing debentures. It was stated in the prospectus that the first issue of shares was for the purchase and working of four estates, therein named, aggregating 2,371 acres. It was also stated that further lands would be acquired and developed. This latter entailed the raising of more capital, and the total acreage is now 7,163 acres. The directors considered that the issue of debentures presented the best and cheapest form

of raising the necessary capital. The directors were of opinion that the company from the first would be a success, and there would be no difficulty raising ordinary and preference share capital when it was required, but as the price of tea gradually fell and tea investments were not in public favour they saw clearly it would not be possible to obtain the necessary capital from the shareholders. The contemplated acreage of development was very materially curtailed, but what was begun had to be brought to completion. The directors have given constant and anxious attention to the affairs of this company from its inception to the present time, without fee or reward of any kind, and respectfully maintain that as they could not foresee that Travancore teas would fall from 8.50d per lb. (the price when the prospectus was issued) to an average of 6.20d per lb., the present state of the company's finances is solely attributable to low prices. Anyone experienced in tea cultivation knows that £35 per acre is a reasonable price at which to bring tea into bearing with buildings and machinery, so it cannot be said the shareholders' money has been squandered. No new clearings of tea have been made for the last two and a half years, and it is practically three years since the land was opened out, roaded, and drained, for planting up. The properties are good, and have been well cared for, and the whole position entirely rests with the future market price of the produce, which we must all hope will soon take a turn for the better. I now move the adoption of the report and accounts.

Mr. H K Rutherford, in seconding the adoption of the report and accounts, said:—I would add a few words to what has fallen from your Chairman, and to recount the history of this company. It was started in 1897 as a tea company to develop and open out tea estates from jungle lands, having as a nucleus a certain acreage of land under tea. The land was reported on most favourably by the Ceylon manager of the Ceylon Tea Plantations Company, a gentleman of very high standing and experience in tea cultivation—and we have no reason, even at the present moment, to doubt the capabilities of the land to be less than he estimated. The principal vendors were your Chairman and Mr Knight, our manager in India—two gentlemen of the highest probity. The price paid was a reasonable one, and I believe they could, had they been anxious to do so, have sold these properties for cash to others, but they were desirous of retaining a large interest in the concern, as they had absolute confidence in the potentialities of the property. That interest your Chairman afterwards considerably increased by purchasing a large number of shares. Your Directors, from their intimate connection with tea, shared in the confidence of the Chairman, and had not the slightest hesitation in investing and joining in the management of the company. Let us now consider why results have fallen so much under our anticipations. There is one fact very patent, that it is not over-capitalisation that is the cause, as the price at which our estates stand is a fair normal cost for opening out and equipping tea properties, and therefore the company stands at practically bed-rock price without inflation. When we negotiated for these properties exchange stood at 1s 2¼d, and the price of the teas at 8½d, and at the present time the former is 1s 4 15-32d, and the latter 6¼d. When I have stated that simple fact I have stated the whole of our case. I do not know if any shareholder has taken the trouble to apply the condition of exchange and the price of tea in 1897 to the accounts in this report, but if so you will find that, had these two factors held good, instead of showing a loss we would have earned Debenture and Preference interest and 7 per cent on the Ordinary shares, and further, if you continue the application to the estimate of crops which it is practically certain the estates will yield, the Ordinary shares would earn something like 50 per cent. dividend. I ask you, therefore, as reasonable men, even if after allowing what one would consider a safe discount in the 1897 conditions of exchange and price of tea, if it can be said any of us—either we as directors, or you as shareholders—went rashly into this venture. Shareholders may complain today of minor matters of finance in our accounts which in a successful concern might have been looked at as virtues, but, believe me, the real crux of our position is the price of tea. If you believe this state of things cannot continue in the tea world very long, then you ought to keep this company afloat. It has potentialities if tea recovers, and if you stick to the ship I have no doubt whatever that you will reap a fair return in due course. So serious is the position of tea producers at the present moment that efforts are being made to bring all into a co-operative movement to reduce the output of British-grown tea for this season in India and Ceylon. If we make no profit whatever out of our estimated crop of 743,000 lb. of tea, then our debit balance, after paying Debenture interest, will be some £8,200, and therefore the £7,000 lb. we ask you for would not suffice, and we would again require to come to you. We do not wish to call upon you for one penny more than necessity demands, and it becomes a question for you to decide whether in the meantime it would be better to make this call in the hope that it may be sufficient to tide us over, or at once re-arrange the company. No one could have foreseen the difficulty, and we must leave the matter in your hands.

Mr. Dangerfield thanked Mr. Rutherford for his remarks, and stated that, although the position was an unfortunate one, the explanations given would, he felt sure, meet the views of the shareholders. He also asked how the required capital was to be raised.

The Chairman stated that that Directors would leave the shareholders to decide how that was to be done. They were, however, prepared to put it *pro rata*. The position of the tea market was accentuated since the report was drawn out. The market might fall again [illegible]y, and they could not say what might happen. They did not anticipate a month ago what had now happened. That being so, the Directors would not pledge themselves that the amount as stated in the report would be sufficient. The call would be spread over a number of years, and would be made as easy as possible.

The resolution for the adoption of the report and accounts was then put to the meeting, and carried unanimously.

Mr. D Reid proposed the re-election of Mr. Rutherford as a director. He remarked that in doing so it was no easy task he was asking Mr. Rutherford to assume. He had always carefully watched over the interests of the Company, and

had devoted much time and thought to their interests. They had been deprived of the assistance of Mr Mackenzie, the chairman for a greater part of the year, as that gentleman had been travelling in Canada and the States with the object of trying to raise the consumption of Indian and Ceylon tea. He (the speaker) joined the board of this Company four years ago, believing that it had good prospects, and that tea from Travancore would realise a good price. The Directors could not foresee that such a mass of tea would be thrown on the market. He thought it would be very unfortunate for the shareholders to throw up the sponge. He believed the depression would pass away, as a great industry, such as the tea industry, could not go on as now. The Directors were all willing to lend a helping hand. They did not get any fees, and the item for keeping the books, &c., was a mere trifle, so there was no such thing as bolstering up the company.

Mr Dangerfield, in seconding the proposal, remarked that the shareholders could take it for granted that the whole of the board were acting in good faith. He had perfect reliance on them, and believed that if the company could be pulled through they would do it.

The resolution for the re-election of Mr Rutherford was then unanimously agreed to.

On the proposal of Mr Worthington, seconded by Mr Dangerfield, the Auditors were re-elected.

The proceedings closed with a vote of thanks to the Directors.—*H and C Mail*, February 8.

THE LIMITATION OF TEA PRODUCTION—A TEA PLANTER'S VIEW.

To the Editor of the *Home & Colonial Mail*.

SIR,—May I ask your permission to make a few remarks on this important subject, more particularly from a planter's point of view? The various conditions are sufficiently complex to make the problem somewhat difficult of solution. I believe, however, that a means may be devised which may be practicable and acceptable to producers. The following scheme may to some extent, perhaps, assist in the matter:—

ESTABLISHED OR MATURE GARDENS.

1. All factories whose tea crop of season 1900 realised, say, 11d per lb gross be exempt from restriction.
2. A graduated scale of restriction as to yield for all estates whose tea crop of season 1900 realised an average price of less than 11d per lb at, say, from 5 per cent. for the finer, graduating to 12 per cent. for the coarser teas.
3. All five-year-old planting to be classed as mature, and four years and under to be exempt from restriction.

ENTIRELY NEW PLANTATIONS.

4. All new gardens of five years' planting to be limited to the average yield per acre of mature plant of the district.
5. All four years' planting and under to be exempt from restriction.

In making these varying distinctions consideration has to be given to the following:—

a. The makers of high-class teas have not contributed unduly to the present glut and therefore should be exempt.

b. The factories producing low-class teas are mainly responsible for the present over-production, and should rightly be subject to restriction.

c. In the case of new planting of four years and under it would obviously be unfair to tax such planting to repair a difficulty to which it had not contributed to any appreciable extent.

6. In order to calculate quantity to be produced by each garden a return of crop of season 1900 to be sent in to secretary of the respective Tea Association, together with statement of new planting for the years 1900, 1899, 1898, 1897, and in the case of entirely new gardens return of area planted in 1896.
7. All gardens manufacturing a special make of coarse tea sent down under a separate mark, not the recognised mark of the garden, to furnish statement of such teas produced in season 1900 to secretary of their Tea Association.
8. All factory marks to be registered with the Tea Associations.

A form of agreement as between two contracting parties could be adopted by which each producer covenants with the joint Tea Associations as representing the whole or any one of the members of the Tea Associations to carry out the engagement as to allotted output, &c., under pain of whatever penalty may be agreed upon.

It occurs to me that the agreement contracted should extend over at least two years—with provision, of course, for such modification as circumstances may render necessary, for little good will be gained by merely clearing away the present accumulation in order to make room for another. The present producing capacity of Indian and Ceylon gardens is far in excess of requirements. It will be necessary, therefore, that production be controlled until it is overtaken by requirements. This brings me to a subject about which I will, in this letter, only remark that the time has arrived when the scope and sphere of influence of the Tea Associations of India and Ceylon should be extended.—Yours truly, JAMES HODGES.

Erdington, Birmingham, Feb. 12, 1901.

PRODUCE AND PLANTING.

THE CRISIS IN TEA.—The Chancellor of the Exchequer is, we fear, not in a mood to lend a kindly ear to proposals to reduce taxation, but the two members of a sub-committee appointed by the Indian Tea Association (London) have thought it advisable to direct public attention to the causes which have contributed to the present crisis in tea. In the circular issued by these gentlemen, and reproduced in another column, it is mentioned that Sir Michael Hicks-Beach will be asked to reduce the Government royalty on tea from sixpence to fourpence per pound. In the circular it is pointed out that the closing of the mints and the fixing of the rupee at the artificial value of 1s 4d by the Indian Government have increased the cost of production by some 20 per cent, while the addition of twopence to the duty last year, instead of coming out of the pockets of the consumer, has fallen almost entirely on producers. A still more cogent argument is that the home Government reaps an annual harvest of six millions sterling from tea, and the total revenue at home being 120 millions, the impost is out of all proportion to other taxes levied. The object of the circular is to invite all those who are interested in the production of tea to help the movement by at once communicating with their local members of Parliament (irrespective of party), asking them to support Sir Henry Seymour King in his endeavour to get the tea tax reduced to its former rate of 4d per lb. We trust that the statements put forward will direct public attention to the grievances of the tea producer, who sees that unless some remedy for the existing state of things is found the important industry developed with such care, patience, and expenditure of capital is seriously threatened.

A TRADE VIEW OF THE TEA POSITION.—"As a natural consequence of the rapidly increasing production of tea within the last few years—that of Indian alone expanding from 148,252,000 lb. in 1897-98 to 182,144,000 lb as the estimated crop for 1900-01—the market here has been so over-supplied with the article," says the *Grocer*, "that steps have been recently taken by a Select Joint Committee of the Indian Tea Association

to call upon the proprietors and agents of estates to restrict the output of tea in India and Ceylon during the current season, and so bring the general supply more under control than it has been hitherto. Besides attaining unmanageable proportions, the quantities of British-grown tea have contained a much greater percentage of common, spurious, and undesirable qualities than ever before known, and in this respect cultivators of tea in Ceylon have been the principal offenders. In November last it was remarked in our London trade report that 'Some very inferior teas have lately been shipped from Ceylon, and such quality has been termed by the trade a disgrace to the island. It would be better if these teas instead of being shipped were destroyed in Ceylon, as buyers here have refused to have anything to do with them, and the Customs are apparently at fault in allowing this rubbish to pass.' Having seen and examined the teas in question we can vouch for the truth of the above statement, certain samples bearing a close resemblance to cinnamon chips, as coarse as chaff or stubble; and one firm of Mincing Lane brokers advises the planters to 'dig into the ground a large quantity of this common red stuff as withered leaves, or to utilise it, after burning, in the form of ash.'"

AN AMERICAN VISITOR.

LARGELY INTERESTED IN CINCHONA SUPPLIES.

Amongst the most recent arrivals from the Far East is Mr. F. L. Seely of St. Louis, Mo., U.S.A., who has come from America *via* Java, travelling for the Paris Medicine Company of St. Louis and London. Mr. Seely has been spending a month at the Government plantations, Java, and has shown us photographs of some splendid trees of *Ledgeriana* and plantations of *Succirubra* which give no less than 12 per cent yield. Any tree, in fact, that gives less is rooted out from the plantation. In one case as much as 16 per cent was yielded. Mr. Seely is travelling in the East to gain some idea of the quantity of supplies of quinine that are likely to be forthcoming in the future, for the Company of which he is Secretary and Treasurer buys an immense quantity annually. Mr. Seely informed us that the preparations sold by it are advertised in every paper in the States, $225,000 being spent annually on advertising alone. Mr. Seely proceeds to Kandy on Monday, and, after visiting estates with Cinchona here, will proceed to the Nilgiris, before returning to the States.

RAINFALL RETURN FOR COLOMBO.

(*Supplied by the Surveyor-General.*)

	1896.	1897.	1898.	1899.	1900	Av of 31yrs.	1901
	Inch	Inch	Inch	Inch.	Inch.	Inch.	Inch.
January ..	2·92	3·81	2·32	6·98	3·72	3·24	11·91
February ..	0·35	1·68	1·98	2·78	0·63	1·89	3 55*
March ..	5·64	3·66	4·21	0·88	3·71	4·75	
April ..	5·93	10·97	22·81	6·66	15·12	11·43	
May ..	9·31	8·30	5·80	17·73	10·63	12·04	
June ..	8·37	10·14	10·94	9·23	7·83	8·35	
July	2·85	5·24	6·15	1·11	6·77	4·30	
August ..	6·35	9·09	0·97	0·62	7·35	3·79	
September	10·99	4·58	6·90	1·48	4·00	4·93	
October ..	16·78	4·71	20·60	12 99	9·47	14·36	
November..	19.81	11·68	17·38	8·58	9·25	12·55	
December..	11·76	8·89	3·05	4·44	5·20	6·35	
Total..	101·06	82·73	103·11	73·48	83·68	88·03	15·46*

* From 1st to 27th Feb. 3·55 inches, that is up to 9·30 a.m on the 28th Feb.—ED. *C.O.*]

Ceylon Rainfall.

THE P. W. D. METEOROLOGICAL OBSERVATIONS FOR JAN 1901.—We append the Monthly Return of rain from which it will be seen that the highest fall in Jan. was at Manalpuddy in the Eastern Province 32·71 inches, and the lowest at Udupiddi in the Northern Province, 0·24 inches.

WESTERN PROVINCE

Negombo, Mr. Bucknall (6) .. 4 55
Kalutara Mr. Emerson (36) ... 7 01
Labugama, Mr. Bond (369) .. 17·37
Henaratgoda, Mr. Silva (33) .. 8·54

CENTRAL PROVINCE.

Katugastota, Mr. Morgan (1,500) .. 1·57
New Valley, (Dikoya) Mr. Waddell (3,700) ... 6 87
Helboda (Pussellawa) Mr. Gosset (3,300) .. 2·65
Yarrow Estate. .. Not received (3,400) —
Peradeniya Mr. Macmillan (1,540) 2·00
Duckwari, Mr. Edwin (3,300) .. 4·75
Caledonia, Mr. Shand (4,273) 3·25
Pussellawa, Mr. Powell (3,000) .. 3·42
Hakgala, Mr. .. Nock (5,581) .. 3·61
S. Wanarajah Estate Mr. Tatham (3,700) ... 6·35
Padupola, Mr. Waddel (1,636) ... 7 05
Mylapitiya, Not received (1,707) .. —
Aluta — do —

NORTHERN PROVINCE.

Mullaittivu, Mr. Ebert (12) 4·62
Jaffna Mr. Macdonnel (8) ... 4·66
Mankulam, (N. Road) Mr. Ebert (167) .. 1·10
Elephant Pass, Not received (7) .. —
Vangalachettykulam, Mr. Oorloff (179) ... 1·20
Point Pedre, Mr. Kretser (24) .. 3·07
Jaffna College, Mr. Hastings (9) .. 0·44
Kayts, Mr. Kretser (8) .. 3·74
Kankesanturai, Mr. Pararachasinghe (10) ... 0·42
Pallai, Mr. Krester (24) .. 0 50
Murikandy, (North-Central Road) Not received (7) —
Nedunkeni, Mr. Ebert (122) ... 10·98
Chavakachcheri, Mr. Krester (16) .. 1·55
Udupiddi, Mr. Brown (35) . 0 24
Marichchukaddi, Mr. Tampue (14) 3·24
Murungan, Mr. Walker (52) 3·22
Vavuniya, Mr. Ebert (318) 1 14

SOUTHERN PROVINCE.

Ella Vella, Mr. Caldicott (262) 6·36
Kekanadura, do (150) 0·47
Denagama, do (286) 4·71
Udukiriwila Mr. Lourensz (235) .. 4·76
Kirama, Mr. Lorensz (260) 13·80
Hali-ela Mr. Caldicott (200) 15·80
Tissa, Mr. Silva (75)
Matara, Mr. Callicott (15) . 3·89
Dandeniya, do (157) 2·79
Urubokka, Mr. Caldicott (890) 15·15
Tangalla Mr. Russell (94) 1·03
Mamadola, Mr. Doole (56) .. 5·78

EASTERN PROVINCE.

Irrakkamam, Mr. Bower (42) ... 6·10
Devilaua, Mr. Suaminathan (136) 3·47
Sagamata, Mr. Bower (40) .. 4·31
Ambare, Mr Kretser (65) 7·29
Kanthalai, Mr. Carte (150) 1·66
Allai, Mr. Bartlett (95) 3·07
Rukam, Mr. Suaminathan (120) 5·38
Periyakulam, Mr. Carte (20) .. 0·75
Chadaiyantalawa, Mr. Goodman (57) 4·52
Kalmuuai, do (12) 4·74
Rotawewa, Mr Bower (30) 5·36
Lahugala, do (70) 2·33
Naulla, do (30) 7·94
Andankulam, Mr. Carte (41) .. 1·06
Manalpuddy, Mr. Suaminathan (21) 32·71
Maha-Oya-Tank, Mr. Suaminathan (190) 9·65
Potuvil, Mr. Sinnayah (10) 4·99
Vakaneri Mr. Watts, (8) .. 6·41

N.-W. PROVINCE.

Magalawewa, Mr. Soopezayan (176) ... 5·97
Maha Uswewa tank, Not received (160) ... —
Tenepitiya, Mr. Churchill (8) ... 6·70
Batalagoda, Mr. Madahapola — 1·74

N.-C. PROVINCE.

Kalawewa, Mr. Chellappah (268) 0·41
Maradankadawala, Mr. Emerson (443) ... 2·49
Mihintale, Mr. MacBride (354) .. 1·55
Horowapotana, Mr. MacBride (217) . 2·70
Madawachchiya, Mr. MacBride (285) ... 0 45
Topare, Mr. Jayewardaue (200) .. 3·81
Minneriya, Mr. Gordon — .. 5 10

UVA PROVINCE.

Bandarawela, Mr. Tocke (4,000) 2·48
Haldummulla, Mr. Viramuttoo (3,160) 8·41
Kumbukan, Mr. Devasagaiam (446) 1·27
Koslanda, Mr. Edge (2,258) .. 9 66
Tanamalwila, Not received (550) ... —
Bibile, Mr. Silva (680) 3·99
Taldena, Mr. Fernando (1,100) .. 6·54
Alutnuwara—Mr. Leembruggen (300) 4·22

SABARAGAMUWA.

Ambanpitiya, Mr. Gregson (729) 4·39
Pelmadulla, Mr. Bingham (480) 5·61
Kolonna Korale (Hulanda-oya), Not received (203) —
Avisawella, Mr. Clarke (105) .. 9·99

SHARE LIST.

ISSUED BY THE

COLOMBO SHARE BROKERS' ASSOCIATION.

CEYLON PRODUCE COMPANIES.

Company	paid p. sh.	Buyers.	Sellers.	Transactions
Agra Ouvah Estates Co., Ltd.	500	—	925	...
Ceylon Tea and Coconut Estates	500	—	—	...
Castlereagh Tea Co., Ltd.	100	...	85	xd
Ceylon Hills Estates Co. Ltd.,	100	—	—	—
Ceylon Provincial Estates Co. Ltd.	500	—	500	xd
Claremont Estates Co., Ltd.	100	—	—	—
Clunes Tea Co., Ltd.	100	—	75	—
Clyde Estates Co., Ltd.	100	...	—	—
Doomoo Tea Co., of Ceylon Ltd.	100	50	—	—
Drayton Estate Co., Ltd.	100	...	...	...
Eila Tea Co., of Ceylon, Ltd.	100	..	40	—
Estates Co., of Uva, Ltd.	500	—	250	—
Gangawatta	500	—	—	..
Glasgow Estate Co., Ltd.	500	—	—	—
Great Western Tea Co., Ltd.	500	..	—	—
Hapugahalande Tea Estate Co.	200	—	—	..
High Forests Estates Co., Ltd	500	...	575	...
Do part paid	400	—	...	—
Horekelley Estates Co., Ltd.	100	65	..	—
Kalutara Co., Ltd.	500	—	300	—
Kandyan Hills Co., Ltd.	100	—	70	—
Kanapediwatte Ltd.	100	—	85	—
Kelani Tea Garden Co., Ltd.	100	--	—	—
Kirklees Estates Co., Ltd.	100	—	120	—
Knavesmire Estates Co., Ltd.	100	—	62½	...
Maha Uva Estates Co., Ltd	500	—	—	—
Mocha Tea Co., of Ceylon, Ltd.	500	—	..	—
Nahavilla Estate Co., Ltd.	500	—	350	...
Neboda Tea., Co. Ltd	500	..	500	—
Nyassaland Coffee Co. Ltd	100	—	—	—
Ottery Estates Co., Ltd	100	—	—	..
Palmerston Tea Co., Ltd.	500	...	450	—
Penrhos Estates Co., Ltd.	100	—	100	—
Pine Hill Estate Co., Ltd.	60	—	50	—
Pitakanda Tea Company	500	—	—	—
Putupaula Tea Co., Ltd.	100	--	—	—
Ratwatte Cocoa Co., Ltd.	500	—	—	..
Raylgam Tea Co. Ltd.	100	...	47·50	—
Roeberry Tea Co., Ltd.	100	..	70	—
Ruanwella Tea Co., Ltd.	100	—	30	—
St. Heliers Tea Co., Ltd.	500	—	..	..
Talgaswela Tea Co., Ltd.	100	—	35	...
Do 7 per cent Prefs.	100	..	70	...
Tonacombe Estate Co., Ltd.	500	..	325	..
Udabage Estate Co., Ltd.	100	...	...	..
Udugama Tea & Timber Co., Ltd.	50	..	..	..
Union Estate Co., Ltd.	500	...	200	..
Upper Maskeliya Estates Co. Ltd.	500	—	—	—
Ovakellie Tea Co., of Ceylon, Ltd.	100	—	70	—
Vogan Tea Co., Ltd.	100	52·50	—	...
WanarajahTea Co.,Ltd.	500	..	1060	..
Yataderiya Tea Co., Ltd.	100	—	350	—

CEYLON COMMERCIAL COMPANIES.

Company	paid p. sh.	Buyers.	Sellers.	Transactions
Adam's Peak Hotel Co., Ltd.	100	25	..	..
Bristol Hotel Co., Ltd.	100	—	120	115xd
Do 7 per cent Debts	100	105	...	—
Ceylon Gen. Steam Navgtn. Co., Ltd.	100	..	225	...
Colombo Apothecaries' Co. Ltd.	100	135	—	135
Colombo Assembly Rooms Co., Ltd.	20	15	..	...
Do prefs.	20	...	..	—
Colombo Fort Land and Building Co., Ltd.	100	—	85	..
Colombo Hotels Company	100	..	295	..
Galle Face Hotel Co., Ltd.	100	145xd	...	145xd
Kandy Hotels Co., Ltd.	100	...	125	122·50
Mount Lavinia Hotel Co., Ltd.	500	—	..	...
New Colombo Ice Co., Ltd.	100	210	...	...
Nuwara Eliya Hotels Co., Ltd.	30	..	30	...
Do 7 per cent prefs.	100	...	102.50	..
Public Hall Co., Ltd.	20	15	16	—

LONDON COMPANIES *

Company	paid p. sh.	Buyers.	Sellers.	Transactions
Alliance Tea Co., of Ceylon, Ltd.	10	...	8¾—9¼	..
Anglo Ceylon General Estates Co.	100	..	25—45	..
Associated Estates Co., of Ceylon	10	..	1½—2½	...
Do. 6 per cent prefs.	10	..	4—6	..
Ceylon Proprietary Co.	1	...	⅜—⅝	..
Ceylon Tea Plantation Co., Ltd.	10	..	24—25	..
Dimbula Valley Co., Ltd.	5	..	5¾—6	..
Do prefs.	5	..	5½-6	...
Eastern Produce & Estates Co. Ltd.	5	...	4½-5	..
Ederapolla Tea Co., Ltd.	10	...	7—10	...
Imperial Tea Estates Co., Ltd.	10	...	4½—5½	..
Kelani Valley Tea Asscn., Ltd.	5	..	5—6	...
Kintyre Estates Co., Ltd.	10	...	6—8	..
Lanka Plantation Co., Ltd.	10	..	4—5	..
Nahalma Estates Co ,Ltd.	1	..	nom	..
New Dimbula Co., Ltd.	1	...	2¾—3	..
Nuwara Eliya Tea Estate Co., Ld.	10	...	10—10½	...
Ouvah Coffee Co., Ltd.	10	..	6—7	...
Ragalla Tea Estates Co., Ltd.	10	..	9—10	..
Scottish Ceylon Tea Co.,Ltd.	10	..	13—15	...
Spring Valley Tea Co., Ltd.	10	...	2½—3½	..
Standard Tea Co., Ltd.	6	..	11—11½	..
The Shell Transport and Trading Company, Ltd.	1	..	2⅞-3⅛	..
Ukuwella Estates Co., Ltd.	25	—	par	...
Yatiyantota Ceylon Tea Co., Ltd.	10	...	6½—7½	...
Do. pref. 6 o/o	10	...	10-10½	..

BY ORDER OF THE COMMITTEE.

Colombo, March 1st, 1901.

* Latest London Prices.

THE LOCAL MARKET.

(By Mr. James Gibson, Baillie St., Fort.)

Colombo, Feb. 28th, 1901.

COFFEE:—		
Estate Parchment per bushel	None	
Chetty do do	Nil.	
Native Coffee per cwt.	Nil.	
do F. O. B per cwt.	Nil.	
Liberian coffee:—per bushel	Nil.	
do cleaned coffee:—per cwt	Nil.	
Cocoa unpicked:—per cwt	R44·00 to 52·00	
do cleaned do	R52·00 to 55·00	
Cardamoms Malabar per lb	R0·80 to 1·00	
do Mysore do	R1·25 to 1·50	
RICE:—		
Soolai per bag of 164 lb. nett	R9·35 to 9·77	
1st quality:—per bushel	R3·70 to 3·75	
Soolai 2 & 3rd. do do	R3·60 to 3·68	
Coast Caluuda	none.	
Coast Kara	R3 90 to 4·00	
Kazala	R3·57 to 3·60	
Muttusamba Ordinary	R4·75 to 5·00	
Cinnamon per lb No 1 to 4	R00·53 to 00·57	Scar
do do 1 and 2	2	Scar
do Chips per candy	R87·50	
Coconuts Ordinary per thousand	R42·00	
do Selected do	R50·00	
Coconut Oil per cwt	R15·00	
do do F. O B. per ton	R300·00	
POONAC:—		
Gingelly per ton	R110·00	
Coconut Chekku do	R110 00	
do Mill (retail) do	R80·00	Very scarce
Cotton Seed per ton	R80·00	
Copra per candy		
Kalpitiya do	R49·00 to 50·00	
Marawilla do (Boat)	R47·50 to 49·00	
Cart Copra do	R43·00 to 44·00	
Satinwood per cubic feet.	Nil.	
do Flowered do	Nil.	
Halmilla do	R1·90	
Palu do	R1·00 to 1·12	
Ebony per ton	R10 ·00 to 230·00	
Kitul fibre per cwt	R30·00 to 32·00	
Palmyra do do	R7·50 to 14·00	
Jaffna Black Cleaned per cwt	R12·50 to 14·00	
do mixed do	R10·00 to 1 .·50	
Indian do	R7·50 to 12·00	
do Cleaned do	R10·00 to 13·00	
Sapanwood per ton	R40·00 to 45·00	
Kerosene oil American per cases,	R6·80 to 7·50	
do bulk Russian, per tin	R3·12 to 3·19	
do Russian per cases	R6·40 to 6·45	
Nux Vomica per cwt	R2·50 to 7·00	
Croton Seed per cwt	R20·00 to 23·00	
Kapok cleaned f o b per cwt	R23·50	
do uncleaned do	R5·50	
Plumbago per ton, according to grade: Large lumps	R275·00 to 600·00	
Ordinary size lumps	R275·00 to 575·00	
Chips	R150·00 to 375·00	
Dust	R60·00 to 200·00	

COLOMBO PRICE CURRENT.

(*Furnished by the Chamber of Commerce.*)

EXPORTS.

Colombo, 25th Feb. 1901.

CARDAMOMS:—
All round parcel, well bleached per lb. R1·70
Do. dull medium do. R1·40
Special assortment, 0 and 1 only do. R2·00
Seeds do. R1·40

CINCHONA BARK:—
Per unit of Sulphate of Quinine 9½c—1½ to 3 o/o.

CINNAMON :—
Ordinary assortment per lb. 57c. }
Nos. 1 and 2 only per lb. 62c, } Scarce.
Nos. 3 and 4 only per lb. 53c. }

CINNAMON CHIPS :—
Per candy of 560 lb R87·50

COCOA :—
Finest estate red; unpicked per cwt R55
Medium do do R52
Bright native, unpicked and undried R49
Ordinary do do do R43

COCONUTS—(husked).
Selected per thousand R52·00 }
Ordinary ,, R41·00 } Very scarce.
Smalls ,, R30·00 }

COCONUT CAKE—
Poonac in robins f. o. b. per ton R72·50
Do in bags None

COCONUT (Desiccated).
Assorted all grades per lb 16c

COCONUT OIL—
Dealers' Oil per cwt R15·00
Coconut Oil in ordinary packages f. o. b. per ton R340·00.

COFFEE.—
Plantation Estate Parchment on the spot per bus. None.
Plantation Estate Coffee f.o.b. (ready) per cwt. - None.
Native Coffee, f.o.b per cwt.—None.

CITRONELLA OIL—
Ready do per lb.—50c

COPRA—
Boat Copra per candy of 560 lb. R49 00 }
Calpentyn Copra do do R50 00 }
Cart do do do R44 00 }
Estate do do do R50·00 }

CROTON SEED per cwt—None

EBONY—
Sound per ton at Govt. depot—R230 }As per last Govt. sales of Dec 3rd.
Inferior R155.—As per last Govt. sales of Dec 3rd

FIBRES—
Coconut Bristle No. 1 per cwt R10·50
Do ,, 2 ,, None
Do mattress ,, 1 ,, 4·00
Do ,, 2 ,, 3 00
Coir Yarn, Kogalla ,, 1 to 8 18 00
Do Colombo ,, 1 to 8 16·00
Kitool all sizes ,, None
Palmyrah ,, None

PEPPER—Black per lb None

PLUMBAGO—
Large lumps per ton R600
Ordinary lumps do 575
Chips do 375
Dust do 200
Do (Flying) 125

SAPANWOOD— per ton None.

SATINWOOD (ordinary) per cubic ft. None.
Do do per cubic ft. None.

TEA—	High Grown Average.	Medium Average.	Low Grown Average.
Broken Pekoe and Broken	cts	cts	cts
Orange Pekoe per lb	60	48	31
Orange Pekoe do	50	40	33
Pekoe do	46	34	23
Pekoe Souchong do	41	20	24
Pekoe Fannings do	27	21	21
Broken mixed—dust, &c per lb	15	15	15

CEYLON EXPORTS AND DISTRIBUTION, FOR SEASONS 1900 AND 1901.

COUNTRIES	Tea. 1901 lbs.	Tea. 1900 lbs.	Coffee—cwt. Plantation	Coffee—cwt. N'tive	Coffee—cwt. Total.	Cocoa cwts.	C'moms lbs.	Cinnamon Bales lbs.	Cinnamon Chips. lbs.
To U K. ..	17302590	14739583	594	..	594	12552	36628	176081	26775
,, Austria ..	16365	16 7	..	..	...	...	..	5000	5600
,, Belgium ...	750	..	33	..	33	...	..	10209	12592
,, France ..	49097	29494	4	...	4	..	1469	7200	3920
,, Germany ..	44067	59929	.	..	..	750	6203	88500	128240
,, Holland ..	11074	..	...	..	..	..	..	1000	17920
,, Italy ..	1102	533	..	..	..	..	...	12500	11200
,, Russia ..	727093	1330119	..	..	...	...	764	.	..
,, Spain ..	...	6970	..	...	..	..	..	30300	19600
,, Sweden ..	12815	13605	...	..	..	..	..	..	..
,, Turkey ..	9866	5251	...	..	...	...	..	..	...
,, India ..	320270	103711	10	..	10	..	27765	..	.
,, Australia ..	2056868	1937961	109	..	109	...	...	...	..
,, America ..	410450	1193274	...	..	...	846	..	10000	9116
,, Africa ..	25084	12710	..	..	..	..	..	..	..
,, China ..	245551	87343	1	...	1	..	..	5000	..
,, Singapore ..	11310	11006	..	..	...	196	..	4000	..
,, Mauritius ..	7800	...	..	..	..	...	..	..	..
,, Malta ..	72632	37820	..	...		..	..	...	..
Total export from 1st Jan. to 25th Feb. 1901	21330796	19569930	751	...	751	14344	71829	350281	234963

COUNTRIES	Coconut Oil. 1901 cwt	Coconut Oil. 1900 cwts	Copra cwts.	Desiccated Coconut lb.	Poonac cwts.	Coconuts. No.	Plumbago. 1901 cwts.	Plumbago. 1900 cwts.	cwts Fibre.	Ebony cwts.
To U K. ..	22911	22822	2000	809968	...	1668570	12851	14955	8285	411
,, Austria ..	772	2220	4451	6	.	..	...	..	...	...
,, Belgium ...	998	...	8798	35140	2001	...	2180	5791	2753	...
,, France ..	...	..	1990	..	...	..	..	..	1	..
,, Germany ..	..	2243	7394	145535	10428	94550	7634	7873	3053	1580
,, Holland ..	..	...	..	...	..	..	..	..	222	...
,, Italy ..	...	..	..	..	..	2000	..	...	...	...
,, Russia ..	...	..	12210	..	..	..	—	...	..	..
,, Spain ..	..	..	...	10370	...	..	...	-	..	..
,, Sweden ..	199	...	...	...	...	..	..	105	..	...
,, Turkey ..	..	...	...	...	...	...	...	...	..	..
,, India ..	6657	8820	300	..	...	222400	19	..	..	..
,, Australia ..	35	21	..	132288	..	..	...	210	532	..
,, America ..	6004	24246	1	221738	..	..	32111	59322	554	..
,, Africa ..	..	...	..	1600	..	128100	...	...	...	..
,, China ..	254	...	.	32500	..	..	..	..	..	...
,, Singapore ..	...	..	...	..	...	...	..	...	47	...
,, Mauritius ..	..	..	...	..	...	...	..	..	..	..
,, Malta ..	..	..	..	...	..	..	..	..	..	..
Total export from 1st Jan. to 25th Feb. 1901	37830	60378	37114	1389145	12429	2125620	54795	88256	15447	1991

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Prices Current, London, February 22nd, 1901)

☞ No Price Current having reached us by latest mail, we omit the usual quotations and fill with other matter.

THE COMMON BIRDS OF BOMBAY By E H A.*

"Eha" is well-known by the volumes "The Tribes or my Frontier," "Behind the Bungalow" and "A Naturalist on the Prowl"; and this latest volume will be welcomed by all who wish to know about the birds that abound in the land of their adoption. To enjoy this book, one does not need to have previous scientific knowledge; the author has watched the habits, haunts and customs of the birds, and in an easy conversational way he tells the reader enough to enable him to recognise and name the feathered songsters around him. Boys are always ready to hunt for birds' nests. Let them take this book out of doors with them and follow up the mother-birds sympathetically, watch them, their ways, their haunts, and the study may be quite as useful to them in after years as that of Latin or French.

The telling pen-and-ink sketches in this book are an additional help to the identification of birds, while the English names so freely given, make the stories life-like and real. The volume has 195 pages, and the chapters (32 of them) follow the natural orders:—The Birds of Prey, the Perching Birds, the Moaners, the Scrapers, the Stalkers, and the Swimmers. Among the Perching Birds or Insessores, the most interesting and best-known are the Woodpecker and the Coppersmith, the Sunbirds and the Hoopoe, the Babblers (which include The Seven Brothers) and the Bulbuls and Orioles. In the introduction, birds are very sympathetically described, thus:—"Though beasts rank above them anatomically and physiologically, birds have in many respects a higher nature. Their wits are quicker, their thoughts sweeter, their tastes finer, and their passions and appetites less gross. With respect to manners and morals they stand on a higher plane altogether. . . . The great majority of them are monogamous during the nesting season, and many pair for life and become devotedly attached to each other. Brides are won by courtship. . . . Much of their time is spent in the duties, or pleasures, of the toilet. Many of them bathe regularly in water, while others prefer a dust bath. Nature gives them an entire new suit every year, sometimes two, in which case the summer and winter suits are often different. If there is any difference in the sexes, it is the male which is most beautifully, or at least most brilliantly, dressed; as is fit, for he is in the front ranks, fighting and making love, while her place is in the sweet backgrounds of life, and quietness and modesty adorn her best." We must quote the description of the Sunbird:—"Our common Sunbird (Arachnethra Zeylanica) seen at a distance and in a dull light, is a tiny bird of a dull brown colour, except on the breast and lower parts which are yellow. But see it at close quarters, with the sun shining on it, as its admiring mate sees it; the top of its head glitters with a hue which Jerdon defines as 'bright, metallic, glossy green,' while Mr. Oates calls it 'metallic lilac.' Its throat and the whole of its back glow with the tints of an amethyst, the shoulders and wings are of the richest maroon red and the tail is black. The admiring mate is herself dressed in the beauty of simplicity. She also is yellow on the under parts, but paler than her lord, while her head, back and wings are of a greenish dusky colour. They are a loving couple and I think the union is for life, for one seldom sees a single Sunbird. Belt and other observers have stated that Humming-birds frequent flowers less for the nectar than for the little insects in them. I am sure this is not true of the Sunbird. It eats plenty of little insects, especially spiders, but it seeks flowers for their nectar. Sometimes it hovers in front of them, like a hawk moth, exploring their recesses with its long tubular tongue; oftener it clings with its minute black feet, throwing its lithe body into all manner of acrobatic attitudes, while it thrusts its slender, curved bill into each tube in turn. And 'between whiles' it skips about, slapping its sides with its tiny wings, spreading its tail like a fan, and ringing out its cheery refrain, *ching-ching, chikee, chikee, chikee*, as if it could not contain all the happiness that filled its little frame." For the description of the nest and the eggs, our readers must refer to the book itself.

* Thacker & Co., Bombay. Price R4·50.

THE LONGEVITY AND VIGOUR OF TEA.—The veteran colonist who writes above the initials "C.S." has some interesting experiences to relate in the letter which we publish elsewhere. The old Kandyan who declared that the tea-bush was a regular jungle plant, nothing could kill it,—was not far wrong.

IMMENSE RUBBER AREA ACQUIRED IN MEXICO.—The newest company organized to go into the planting of rubber exclusively is the Obispo Rubber Plantation Co., which has been incorporated under the laws of New Jersey. It will acquire a large plantation known as "La Republica," in the state of Oaxaca, Mexico, a property consisting of 9000 acres, of which at least 8000 acres will be planted entirely in rubber, 200 trees to the acre. This will form probably the largest rubber plantationin the world.—*India Rubber World.*

THE

AGRICULTURAL MAGAZINE,

COLOMBO.

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for March :—

Vol. XII.] MARCH, 1901. [No. 9.

AGRICULTURAL INSTRUCTION FOR VILLAGE YOUTHS.

IN our last issue we took over two interesting articles on this subject but had no opportunity of adding our own views. As might have been inferred, however, from the absence of comment on our part, we are entirely in sympathy with the movement that has found favour in England, as well as the Australian and West Indian Colonies, and do not hesitate to say that the system of agricultural instruction in rural schools may be expected to be as fruitful of good results in Ceylon as elsewhere.

It must be borne in mind that what is aimed at by this new scheme is not technical education in the science and practice of agriculture, but rather the directing of the young mind to the study of nature, so that the natural surroundings of the village lad may present new beauties and fresh interests and possibilities to him and reconcile him to the so-called dull monotony of a country life.

To most of our village population the germination, developement and reproduction of vegetation are a mystery, and the realization that plants are living and breathing organisms performing all the vital functions of such, must come as a great revelation to the majority of our rural friends. A knowledge of the forces of nature as they work through plant and soil, the wonderful adaptations of these forces and the interdependence of the mineral, vegetable and animal kingdoms is what is wanting in the villager who sees nothing of design and recognises little of the sequence of cause and effect in his "common round and daily task." Under such circumstances is it any wonder that he becomes discontented with his lot, which he is wont to associate with manual labour pure and simple? Jerome, in one of his books, has a beautiful passage referring to the companionship of plants. It is this companionship which the new scheme seeks to establish in order that the life of the rustic may present a new charm for him which so long it lacked, and his environment appeal to his instincts in a manner that he has never experienced before.

An intelligent knowledge of nature in her various phases should be so much power in the possession of the youth of the village, which he will be able to use to his advantage. With such knowledge his lot will be infinitely more congenial to him, his prospects more cheerful and (what is devoutly to be wished) his inclination will be to remain amid his rural surroundings and apply himself to the cultivation of the land with a new zest. Thus it is to be hoped will the people of the country be led to develope its agricultural resources, and while the cities are relieved of the congestion of disappointed place seekers, the country be made the home of the industrious and contented husbandman bent on making the most of his newly-recognised opportunities. We trust the hope will be realized.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF JANUARY, 1901.

1	Tuesday	Nil	Friday	18	·22
2	Wednesday	Nil	Saturday	19	·05
3	Thursday	·01	Sunday	20	1·85
4	Friday	·34	Monday	21	·94
5	Saturday	·23	Tuesday	22	Nil
6	Sunday	Nil	Wednesday	23	Nil
7	Monday	·01	Thursday	24	·01
8	Tuesday	2·96	Friday	25	Nil
9	Wednesday	·17	Saturday	26	Nil
10	Thursday	·32	Sunday	27	Nil
11	Friday	·02	Monday	28	Nil
12	Saturday	Nil	Tuesday	29	Nil
13	Sunday	Nil	Wednesday	30	Nil
14	Monday	Nil	Thursday	31	Nil
15	Tuesday	Nil	Friday	1	Nil
16	Wednesday	·09			
17	Thursday	·26		Total..	7·48
				Mean..	·24

Greatest amount of rainfall in any 24 hours on the 8th, 2·96 inches.

Recorded by C. DRIEBERG.

OCCASIONAL NOTES.

The *Agricultural Magazine* for August, 189 , contains an article entitled "The Queen as Agriculturist," in which a short history of Her late Gracious Majesty's connection with the agricultural interests of England was given. In concluding the article we said, "Whatever be the fate of English agriculture in days to come, the Royal family will be sharers in its prosperity or adversity, the bright traditions of the reign of Queen Victoria will be honoured and observed for many a day." King Edward the Seventh may confidently be expected to protect the interests of the agriculturist, for has he not already earned the sobriquet of "the Friend of the Farmer"?

At the great Scottish Annual Show held last year in Edinburgh, Sir John Gilmour speaking at a meeting over which King Edward—then Prince of Wales—was presiding, referred to His Majesty as "a Prince who followed so well and fully in the footsteps of Her Gracious Majesty, our Beloved Queen, and who had so thoroughly gained for himself the title 'The Friend of the Farmer.'"

The following typical little speech by His Royal Highness delivered only a few months ago will be read with interest at this time when the Prince that was is King, and the Duke of York who is about to visit our shores is the Prince Elect:—

The Prince of Wales, in responding to the vote of thanks, said: My Lords and gentlemen—and, may I say, brother agriculturists?—I am deeply sensible of the kind terms in which Sir John Gilmour has proposed the vote of thanks to me. I am also most grateful for this cordial reception and the kind words which fell from the Lord Provost of this great city. I need hardly tell you, as I mentioned to-day already, the great pleasure it gives me to be your President at this great Show at Edinburgh at the close of the present century. One has often heard of walking in one's father's footsteps. Well, in this instance, gentlemen, I am walking in my son's footsteps. In 1893 you kindly elected him to be President for the year. He had a good reason for not coming, for he married a wife and could not come. But he came the following year, and presided at your Show at Aberdeen. I shall always look back to this visit with the greatest pleasure and satisfaction, and for the kind and cordial way in which you received me. I hope before I leave to-morrow to have had an ample opportunity of seeing all that is of interest in this Show. I am glad to think that it has reached already the one hundred and fifteenth anniversary of its existence. At the Centenary Show, I believe, there were the largest exhibits of horses, sheep, cattle, and swine, amounting to 1,536. I think we have done very well this year when we have exhibits in these classes, as I believe, to the number of 1,417. I can only allude for a moment to the Scottish Agricultural Benevolent Institution. It has only been in existence for two years. From what fell from the lips of Lord Mansfield, it is indeed an institution, though young, which is, I think, well worthy of your support. Anything that can be done to alleviate the suffering of the agricultural class, male and female, deserves our sympathy and philanthropic efforts. I need hardly say it will give me great pleasure on this occasion, if I may do so, to give a donation of £50 towards it. I shall not keep you longer, as I think on these occasions that brevity should be the soul of wit; but I thank you once more for your kind reception, and I can assure you how proud I have been to take the chair to-day.

Veterinary Surgeon Chinniah's paper on the Branding of Cattle—reprinted from the pages of the *Agricultural Magazine*—has appeared in pamphlet form, and been favourably noticed by the local press.

Mr. A. F. Broun, Conservator of Forests, has left the Island on leave, his duties being discharged by Mr. Alfred Clark of the same department. The work of the Forestry School will be in abeyance during the absence of Mr. Broun, who during his holiday, expects to revise his lectures on Sylviculture and Forest Utilization with a view to their publication. The students who have just left the Forestry School are Messrs. D. W. Goonesekere, C. A. Bartlott, S. Lovell, W. Amerasekere, C. S. Fernando and J. T. de Silva. A Syllabus of the School, printed at the Government Press, is now available.

We welcome back to the Island Mr. W. E. Davidson, C.C.S., who proceeded to Paris as the Delegate of the Ceylon Government at the Great Exhibition of 1900. Mr. Davidson has done much to advance the agricultural interests of the Colony, and his excellent handbook prepared for the Paris Exhibition is a compendium of the latest and most reliable information about Ceylon and its industries.

We have to thank Mr. A. Chinniah, Veterinary Surgeon, for a photograph of the Calculus, the operation for the removal of which is described by him in his contribution on Crystology to the present number. Considering the weight of the stone ($3\frac{3}{8}$ oz.), its circumference ($7\frac{1}{4}$ in.), and the fact that the patient was discharged within 3 weeks, we cannot but commend the skill with which the operation was done and the successful antiseptic after-treatment.

Comparing the rainfall at the School of Agriculture and the Fort, we find a difference of about 8 inches for the year 1900, the larger rainfall being in the Cinnamon Gardens.

Some months ago a question was asked in the Press with reference to the most approved way of placing a thermometer for getting reliable readings, and if we remember aright, it was given as the opinion of an expert that the nature of the shade provided was not of consequence. We should like to state that we have found an appreciable difference between the readings under a Calicut-tiled roof and one covered with the old-fashioned half-round tiles, and we have no doubt that there will be a difference where the roof is of galvanized iron and again of olas. It would, therefore, be as well that there should be a uniformity of conditions, particularly in the tropics, as regards the conditions under which thermometers are kept.

In this connection we might refer to a case where the conditions under which rain was registered could not possibly have helped to give correct readings. The rain gauge, in this case, was so placed that a "Union Jack" fluttered on its pole above with the result that the precipitation of rain must have been seriously interfered with.

CYSTOTOMY.

BY VETERINARY SURGEON A. CHINNIAH, COLOMBO, CEYLON.

History.—A black waler gelding pony about 14·2 high, eight year old, the property of W. W. Kenny, Esq., of Colombo, was brought to my surgery with the history that the animal had been passing highly blood-coloured urine. It was treated by me for some time with palliative drugs as in the case of ordinary Haematuria; but when the case assumed an obstinate nature I suspected that there must be some mechanical agent—such as a Calculus—doing the mischief, as the symptoms suggested. The animal was examined per rectum, and the presence of the Calculus was diagnosed with certainty.

Symptoms.—There was painful straining during micturation, but at times the urine passed was of normal colour and consistency. After brisk exercise the urine passed contained blood corpuscles and pigments in abundance, and the expression of the patient during the passing of urine indicated great pain. The appetite was all throughout good, and there was no noticeable rise of temperature. As soon as the proper diagnosis was arrived at, I informed the owner that the animal must stand the operation, which, if it succeeded, was the only means of saving the life of the beast.

Modus Operandi.—The instruments taken for the operations were scalpels, sharp-pointed bistoury, Symes' artery forceps, bull-dog forceps stone forceps, Gullion's lithotritor, male catheter, and the female washing catheter.

The animal was thrown on the near side and general anaesthesia (chloroform) was administered. The penis was pulled out, washed and lubricated, and the catheter was passed and the penis retained all throughout in this position by an assistant told off for the work. The off-hind leg was drawn a bit in front, I took my position just near the croup. The tail was washed antiseptically and given in charge of another assistant to be kept in the desired position. An incision was made two inches below the rectum along the middle line of the perinium downwards. When the urethra was reached, the sharp point of the bistoury was introduced into the tube (urethra) which was eventually slit open to admit the passage of the forceps. When the forceps were in the bladder the stone was grasped with the, assistance of my left arm in the rectum. Several attempts were now made to remove the stone without performing cystotomy or lithotrity, but they proved futile.

I finally decided to perform Cystotomy. The bistoury was passed along the urethra into the mouth of the bladder, and guided by my left hand per rectum to prevent any rectal fistula, an incision was made dividing the mouth of the bladder, prostrate glands and (unavoidably) the pudic artery. The latter was promptly caught and ligatured. This made the operation simple, and with the help of the hand, per rectum, the removal of the Calculus was easy enough.

The Calculus weighs $3\frac{3}{8}$ ounces and its circumference is $7\frac{1}{4}$ inches. It is not spherical, but convex on both surfaces, and the margin unbroken and round. The outer layer is apparently composed of Phosphate of Lime and the urine of Oxalate of Lime.

After Treatment.—The bladder was washed with a tepid solution of Boracic acid. The wound was antiseptically treated and painted with Iodoform and Eucalyptus oil and left open. The animal micturated soon after the operation and passed urine both through the wound and along the natural passage. The passage through the wound ceased after the first day of the operation, 27th January, 1901. The wound was daily dressed antiseptically with what I call an antiseptic emulsion, composed of Boracic acid, Carbolic acid, Iodoform, Eucalyptus oil, and Glycerine, and satisfactory progress continue to be made. The animal was discharged from my Surgery today, 16th February, 1901.

THE VELVET BEAN.

The following notes from the *Queensland Agricultural Gazette* refer to results of experiments made in Mackay, Queensland, by Mr. A. A Ramsay:—

The velvet bean was planted at the beginning of November, 1899, and the analysis refers to the crop at 31st April, 1900. The crop was sown in drills.

Date of Planting—4th November, 1899.
Date of Harvesting—3rd April, 1900.
Yield in tons per acre—18·250.

The analysis gave of moisture	...	72·370 %
1. Mineral matter ...	...	4·232 %
2. Organic matter ...	...	23·398 %
		100·00

1. The Mineral matter contained of potash	·2990
Phosphoric anhydride	·0600
2. The Organic matter continued nitrogen	·8250
Per cent nitrogen in dry substance	2·9858

Moisture per acre of crop	..	13·208 tons.
1. Mineral matter do	...	·772 ,,
2. Organic matter do	...	4·270 ,,
		18·250 tons.

1. Containing potash	...	122·23 lbs.
Phosphoric anhydride	...	24·53 ,,
2. Containing nitrogen	...	337·26 ,,

Money value of potash, phosphoric anhydride and nitrogen per acre £13 10*s.* 9*d.*

THE "UNCULTIVATED" OILS OF CEYLON.

Among the exhibits sent from Ceylon to the great Exhibition at Paris last year was a small collection of the most useful oils produced by forest trees and uncultivated plants. Some of these from their importance as medicinal agents are worthy of special attention and examination by experts, and it is with the object of bringing them to the notice of medical men and others who may be interested in this subject that we are led to enumerate the oils and write short notes on their medical virtues, as known to the natives of Ceylon and India.

1. DUHUDU OIL.—This is the product of *Celastrus paniculatus* (Celastraceae) sometimes called the oleum nigrum plant, from the dark colour of the oil. The plant is of the nature of a scandent shrub. It is from the seeds that the dark red oil is extracted. This is acrid and pungent in flavour, and has a tendency to deposit a fat when kept. Medicinally the oil is used in India for beri-beri, rheumatism, dropsy, and also as a diuretic, diaphoretic and nervine stimulant. Among the natives of Ceylon it is considered to strengthen the brain, purify the blood and cure internal and external sores and boils, while it is highly recommended for external application in rheumatic and gouty pains.

2. IRIYA OIL.—This is the product of *Myristica irya* (Myristicaceae) a moderate-sized evergreen tree. The oil from the bark is used in the treatment of sores.

3. WAL-DEL OIL.—This is the produce of *Artocarpus nobilis* (Urticaceae) a fairly large-sized tree. The juice of the bark is used to kill maggots and is said to be used in other ways in cattle treatment. The oil which is not made mention of in any botanical works I have had access to, is, as I am informed, extracted from the seeds, and as the outer shell of the seed when roasted is considered good eating, the oil is probably also edible.

4. MAKULU OIL.—This is the product of *Hydnocarpus venenata* (Bixineae) a large tree generally found on the banks of rivers. The seed yields an oil of the consistence of soft butter, known in South India (Kanara) as *Thertay* oil. Externally the oil is used in cutaneoms diseases, and is considered specially valuable in the treatment of leprosy, being recommended as a substitute for the well-known chalmugra oil (got from *Gynocardia odorata*).

5. DIVIKADURU OIL.—This is the product of *Tabernaemontana dichotoma* (Apocynaceae) also known as the "forbidden fruit," and "Eve's apple. The tree is small in size. The oil is extracted from the seeds and is used in the treatment of sores and ulcers.

6. MADOL OIL.—This is the product of *Garcinia echinocarpa* (Guttiferae),—a tall tree of the forests in the lower mountain zone. The thick oil is extracted from the seeds. Thwaites mentions that it is burnt but yields a poor light. The leaves and bark are used in dropsical affections, and also as a vermifuge: no mention is, however, made of the oil being medicinally employed.

(*To be concluded*).

MILCH CATTLE AND THEIR PRODUCE.

The latest volume of Transactions of the Highland and Agricultural Society contains an instructive paper entitled "Lessons of a Milk Record," in which important deductions from a properly-kept record (which every dairy farmer should have) are given by the writer for the benefit of dairy farmers.

In keeping a milk record it is recommended that the milk should not be measured but weighed, and the most convenient way of doing this is by using a spring balance in which the scale is so set that no deduction is necessary for the can.

There are so many causes that affect the quality and quantity of milk that only a long series of records and tests can be expected to supply data for reliable deductions. Rough treatment, exposure to rain and rough weather, change of diet, change of milkers, rapidity of milking, length of interval between milking, unusual excitement, or sickness, all tend to temporarily affect the richness of milk and the quantity yielded; while it is the case that some cows' milk varies considerably *without any apparent cause.*

Cream tables for testing the percentage of cream in milk are to be at once put down as absolutely unreliable. In testing the milk of 20 cows, it was found that while the percentage of cream as

shown by setting varied from 4·7 to 20·3, the percentage of butter fat varied only from 3·2 to 5·6, these limits being exceptional, the majority of fat records approximating 3·5 per cent, while the cream records were very inconsistent.

En passant, the writer gives his vote in favour of separating over cream raising, in view of the former producing more constant and larger percentages of cream and butter.

The most convenient and rapid way of ascertaining the percentage of fat in milk is by using Dr. Babcock's machine.

The percentage of fat as recorded in the case of a milking herd through a period of 5 years varied from 3·45 to 3·68.

The milk was richest when the majority of cows were pretty far on in the period of lactation, exemplifying the old story that when the quantity decreases the quality increases.

Again, cows were found to give richer milk when young than they did after they reached the age of 8 years or upwards. At the commencement of keeping the record in 1894 it took 25 lbs. of milk to make 1 lb. of butter, and with the same cows 5 years later the quality had degenerated so much, that 27½ lbs. were required for the same result. Such facts as these, it will be admitted, are most important to the dairy-farmer, and prove the value of milk records.

As regards milking we are told that a good milker will get more and richer milk than one who does not put life into his work. Continental experiments all point to one conclusion—rapidity of execution and thorough stripping are essential to good dairying. But, as remarked before, there are cases which baffle the most careful experimenters, where every condition may be favourable and yet the precentage of fat is abnormally low.

With milking records available we have the best means of selecting not only our dairy cows but also (what is of more importance) the stud bulls of the farm. It would, therefore, appear that a little time given to the testing of milk as to quantity and quality (it need not be every day, but, regularly) will greatly facilitate our own work and the work of others in the dairy, and help to make dairying a more exact science than it is at present.

QUARTER-ILL.

This is a highly fatal disease that effects the bovine species. It may effect other animals but this must be considered as very exceptional. The cause of the disease is the entrance into the system of a specific germ—the quarter-ill bacillus. The germ is most readily found in the tumours localised in the muscular parts of the body, such as the quarter, shoulder, &c.

Quarter-ill, like distemper in the dog, affects young growing animals. There is a difference of opinion as to a plethoric or non-plethoric condition being predisposing, but the majority of authorities rather incline to favour the former view. Very young calves and full-grown animals are, as indicated above, never attacked except under the rarest circumstances, so that it is to be inferred that the muscular tissues are at a particular age a fit habitat for the bacillus, which thus enters the animal organism from the soil where it first exists.

The most striking symptom is the localised, painful and hot swellings generally about the quarters and shoulder. The chief character of these tumours is the crackling sensation they impart to the touch—due to the pressure of gas within them. As a rule, lameness follows, depending in degree on the localisation and severity of the tumours. Fever and other indications of derangement in the healthy condition of the body are apparent on examination.

There may be said to be three methods of treating quarter-ill :—(1.) The depletory method recognises the use of purgatives, setoning, &c., which are employed also as preventative measures. (2,) Preventative inoculation advocated by French Veterinarians. (3.) Natural prevention, which consists of preserving the surroundings of the animals in a condition that is distateful to the bacillus.

The germ, like most other germs thrives in the soil under certain conditions, and therefore may be said to have a limited existence in it. Contaminated soils would be most prolific in the propagation of the germ, so that it is only reasonable that the greatest precautions should be taken in the disposal of quarter-ill carcases which are best burnt or buried deep with lime.

Land, on which quarter-ill has prevailed, should be well drained and cultivated, though it is problematic whether it is safe to allow the stock to consume the fodder : under any circumstances it is best to prevent all young from grazing on such land.

INTRODUCTION TO ENTOMOLOGY.

(MISS ELEANOR A. ORMEROD.)

Larva (Maggot, Grub, Caterpillar, &c.).—If an insect-egg about to hatch is held against the light, or examined as a transparent object by means of a strong magnifier, it will be seen that there is a speck inside which increases in size and becomes more regular in shape daily, until it is too large for the egg to contain, when it breaks through this thin film which serves as an egg-shell, and often begins life by eating it. This is the larva. It is usually hatched from an egg, but sometimes is produced alive (as some fly-maggots, or Aphides during the summer months). When it is coloured and has many feet, it is usually called a caterpillar; white fleshy larvae, such as those of many Beetles or Flies, are commonly known as grubs or maggots; such as resemble the parent insect are usually known by the name of this insect; but the term of "worm" or "slug" is objectionable, as it leads to confusion.

Larvae differ very much in appearance: some are legless, cylindrical, or blunt at the tail, and tapering at the head end, with the head (which is soft and furnished with hooks by way of feeding apparatus) capable of being drawn some way back into the maggot; many Fly-maggots are of this kind.

Some larave are legless or with the mere rudiments of a pair of legs on each of the three rings behind the head, fleshy, smallest at the tail, and furnished with distiuct head and jaws; such are some kinds of Beetle—and Wasp-grubs; others are strong and fat, a few inches in length, with three pairs of legs well developed—as the Cockchafer grub.

The caterpillars of the Butterflies and Moths are often beautifully marked, and have for the most part a pair of articulated feet on each of the three segments behind the head, and pairs of fleshy appendages called sucker-feet on some of the other segments and at the end of the tail, not exceeding sixteen in all. These "Sucker-feet" enable the caterpillars to hold firmly to the twigs they frequent. Proceeding onwards still by number of feet, the caterpillars of the Sawflies will be found in every case (Corn Sawfly, *C. pygmoeus*, excepted) to have, besides the three pairs of true feet, five, six, or seven pairs of sucker-feet, and also the pair at the end of the tail (known as the caudal pro-leg).

Sometimes, as with Grasshoppers, Locust, Aphides or Green Fly, Plant Bugs, &c., the young in the first stage—whether produced alive or hatched from the egg—much resembles the parent, that is, has a distinct insect shape, of head with horns, trunk or thorax, furnished with six legs, and abdomen; and differs mainly in size and in being wingless; but, whether in this shape, or what is known as grub, maggot, or caterpillar, or whatever kind of insect it may belong to in this stage, it is scientifically *A. Larva.*

In this larval stage the insect feeds voraciously and often grows fast: the skin does not expand beyond certain limits, and when this point is arrived at, the larva ceases feeding for a while; the skin loosens, cracks, and is cast of by the creature inside, which comes out in a fresh coat, sometimes like the previous one, sometimes of a different colour or differently marked. This operation is known as moulting, and occurs from time to time till the larva has reached its full growth. The duration of life in the first or larval state is various; in some instances it only extends over a week or two; in some (as with the wireworm and caterpillar of the goat moth) it lasts for a period of three, four, or five years.

As far as observations go at present—that is to say, with such kinds as have at present been obscured—larvae are not injured by an amount of cold much beyond what they are commonly called on to bear in this country, but they are liable to injury from over supply of moisture, whether from sudden rain in warm weather or from full flow of sap of their food-plant, and in this point of their constitutions we have a principle that may help much towards getting rid of them.

When the larva has reached its full growth it ceases feeding, and (in the forms known as caterpillar, grub, or maggot) it usually either goes down into the ground and forms a cell in the earth, or spins a "cocoon" (that is, a web) round itself of threads drawn from the lower lip (as in the well-known silkworm-cocoon), or in some way it makes or seeks a shelter in which it changes from the state or *larva* to that of *pupa*. These various changes are not mere matters of curious enquiry, but can be used very serviceably, in prevention of recurrence of attack.

COMPOSITION OF INDIAN COWS' AND BUFFALOES' MILK.

Agricultural Ledger (Calcutta), No. 19, treats of this subject.

The information on the composition of Indian Cows' and Buffaloes' Milk is very meagre. One analysis of cows' and one of buffaloes' milk was published in the Proceedings of the Madras Board of Revenue in 1892 (*vide* Board's Proceedings No. 387, dated 25th May, 1892), and the average composition of each kind of milk is published in Mr. Collins' Agricultural Chemistry, page 28. The latter were deduced from a number of analyses which Mr. Collins made at Poona, but unfortunately the Note Books containing the details were lost in transit by rail in 1898.

The composition of cows' milk has been found in England to be very regular for different breeds, and to possess a relationship between the several component parts for all the breeds. It is of importance to know whether these relationships hold good for Indian breeds of cows, and to what extent they vary in the case of the buffalo.

The analyses published by the Madras Board of Revenue are only two in number, and are therefore quite insufficient for the purpose in any case. In addition, however, they show the proportions of Proteids and Lactose to be alltogether different from anything met with in the case of English cow's milk.

Mr. Collins found, on the other hand, that the composition of the milk of the several breeds of cows at Poona coincided with that of English breeds. The milk of the buffalo he discovered was characterised by a high proportion of butter-fat and considerably more Proteids than that of the cow. Owing to the loss of the detailed notes, it seemed to me very desirable that the work should be repeated, and in the following pages I give the composition of the milk of some of the cows and buffaloes at Poona, and that of the cows at the Saidapet Agricultural College Farm. This information is set out in the accompanying Statements Nos. I., II. and III.

It has been found in England that (*a*) there exists a relationship between the Solids-not-Fat, the fat and the specific gravity, and (*b*) between the proportions of Proteids, Lactose and Mineral matter (ash), and that these relationships are constant, within certain limits, for all the several breeds.

Regarding the former, several formulæ exist. That of Richmond (*vide* "Analyst," Vol. XX., p. 57) is expressed, thus:—$S = \cdot 25G + \cdot 2F + \cdot 14$. Another recently worked out by Leonard is expressed:—$F = \frac{4}{5}(T - \frac{G}{4}) + (0\cdot 3 - 0\cdot 004T - 0\cdot 01G)$ where T = Total Solids; S = Solids-not-fat; F = Fat; G = the excess of gravity over 1,000. The latter formula gives results which differ only slightly from Richmond's. The proportions of

Proteids, Lactose and Mineral matter in English cows' milk has been found to be approximately as 9 : 13 : 2. It is of interest then to consider in how far those relationships hold good for Indian cow's milk.

In the case of the Poona cows' milk, the specific gravity was not determined, but this was done for the milk at Saidapet. The results are set out in the lower part of Statement No. III., from which it will be seen that the relation between the Solids-not-fat, the Fat and the Specific gravity is the same as it is in the milk of English cows, the variation between the proportion found by analysis and that calculated by Richmond's formula lying within the error of experiment. Similarly, in the lower part of statement No. II. is set out the proportion of Solids-not-Fat found and calculated for those buffalo milks in which the specific gravity was determined at Poona, and here also the relationship holds good and is the same as for English and Indian cows' milk.

Regarding the relation between the proportions of Proteids, Lactose, and Mineral matter, Statement No. IV. exhibits it for two samples of the average milk of the Poona cows, for three samples of the average cows' milk at Saidapet, and for the average buffalo milk at Poona.

Statement No. IV.

	Proteids.	Lactose.	Mineral matter.
Cows' milk, Poona, average, 6th February, 1899	9·20	12·86	1·94
Cows' milk, Poona, average, 28th February, 1899	9·25	12·72	2·03
Cows' milk, Saidapet, average, 29th March, 1900...	8·66	12·25	2·09
Cows' milk, Saidapet, average, 4th April, 1900 ...	8·71	13·25	2·04
Cows' milk, Saidapet, average, 7th April, 1900 ...	8·74	13·31	1·95
Buffaloes' milk, Poona, average, 6th March, 1899	10·78	11·33	1·89

From these figures it is evident that in this respect also, the milk of the Indian cow corresponds to that of the English one, and that the proportions of Proteids, Lactose and Mineral matter is approximately as 9 : 13 : 2. In the case of the buffalo milk the relationship is different, that of Proteids being distinctly higher, that of Lactose lower than in cow's milk,

Generally, it may be said that :—(*a*) The milk of the Indian cow containsa high proportion of butter-fat, varying from 4 up to 6 per cent. Buffaloes' milk contains usually much more, varying from 5 or 6 per cent up to as much as 10 per cent. (*b*) The percentage of Proteids (Albumen and Casein) usually varies in cows' milk from 3·1 up to 3·5 ; in buffaloes' milk from 3·5 up to 4·3. The buffalo, Nevasi, was exceptional. Such proportions as 5·0 and 5·2 per cent of Proteids as stated in the Madras publication referred to, are never found ; (*c*) The percentage of milk sugar (Lactose) in the cow's milk varies from 4·4 to 5·0, and in buffaloes' milk it is present in about the same proportion. It is never so low as is stated in the Madras publication ; (*d*) The percentage of Mineral matter in the cow's and buffaloe's milk varies from about 7 to 8 as it does in English milk.

ORIGIN OF THE SEEDLESS ORANGE.

The first seedless orange-trees were apparently freaks of nature. Their counterparts have never been found. In the summer of 1872 William F. Judson, United States Consul at Bahia, Brazil, heard an account from natives of a few trees in the swamps on the north bank of the Amazon, some sixty miles inland, that bore oranges without seeds. He had heard of the starting of orange groves in Florida, and he believed that seedless orange-trees were well worth experimenting with there. So he sent a native up the river to cut some shoots of the trees and get some of the fruit. When the native returned the Consul was delighted with the specimens. Forthwith he sent six of the orange-tree shoots, carefully packed in wet moss and clay, to the Agricultural Department at Washington for propagation. The trees did not excite as much attention in the Department as the enthusiastic Consul had expected. Two of the shoots, which were no bigger than horse-whips, died from lack of care in the Department grounds, and the others were almost forgotten in a few months.

In the winter of 1873, Mrs. Horatio Tibbetts, who was collecting specimens of fruits and shrubs suitable for experimental propagation in southern California, among other things got from the Department grounds the four surviving orange-tree shoots from Brazil. The trees reached Mr. Tibbets safely at Riverdale, Cal., a week later and were immediately planted. That was in December, 1873. Two of the shoots died from neglect and another was broken and chewed up by a cow. Five years passed and the two surviving trees came into bearing. In the winter of 1878-9 they bore sixteen oranges, the first seedless oranges ever grown in North America. The specimens were carried about southern California, and shown to all ranchmen and fruit-growers. There were many who doubted whether the trees would annually bear such royal specimens of orange culture. Nearly everyone believed that the fruit would become coarse and tough in a few years more. So the second crop was awaited with curiosity among the neighbours. There were about a box of oranges in the second yield, and they were even better than those of the first crop.

The planting of groves of seedless orange trees propagated from buds from the two original trees on the Tibbetts' place began in earnest throughout southern California in the winter of 1882.

A year or two after the orange trees that had been propagated from the Tibbetts' trees began to bear, and they themselves furnished tens of thousands of navel buds as good as those from the two original trees. Then the first navel orange groves began to bear fruit, and from that time the boom in naval orange groves has continued.—*New York Sun.*

GENERAL ITEMS.

A curious way of dwarfing plants for table decoration, says an exchange, is to take an orange, and, having cut a small hole in the peel, to remove all pulp and juice, fill the skin thus emptied with some coconut fibre, fine moss, and charcoal. just stiffened with a little loam. In the centre of this put an acorn, date stone, or the kernel of any tree that it is proposed to obtain a dwarf from. Place the orange peel in a tumbler or vase in a window, and moisten the contents occasionally with a little water through the hole in the peel, and sprinkle the surface with fine wood ashes. In due time the tree will push up its stem through the compost and its roots through the orange peel. The roots must then be cut flush with the peel, and the process repeated frequently for some time. The stem of the tree will assume a stunted gnarled appearance, making it look like an old tree. When the ends of the roots are cut for the last time, the orange peel which curiously enough does not rot, may be painted black and varnished. Has any one given this a trial? It is worth trying whether it will succeed with us in a tropical climate.

Mr. Ranglaret, a Frenchman, has discovered a very simple means of stopping bolting horses. It consists of a pair of moveable blinkers fixed with the ordinary blinkers, and connected by means of a string which passing through a ring attached to the collar or saddle is held by the driver. On the horse bolting the string is simply pulled till the false blinkers close up the eyes of the horse so that he cannot see and stops bolting. It is said that experiments carried out before the French Minister of War proved entirely satisfactory.

The imperial cwt. of 112 lbs. may be taken in an average fed animal as representing 64 lbs. carcass or dead weight. Prime animals would give a larger percentage of carcass, perhaps as high as 72 lbs. in very choice bullocks, anp inferior cattle a less proportion down to 60 lbs. per cwt. live weight.

The following is recommended as the best ration for a horse during a sea voyage: 5 lbs. oats, 5 lbs. bran, 10 lbs. (about 3 cubic feet) hay, 8 lbs. straw, ½ gill vinegar, ½ oz. nitre, and 8 gallons water.

To avoid the labour of constantly stirring jam, in the course of preparation, place half a crown in the bottom of the cooking pan, before putting the fruit in. You will find (says the *Australian Farm and Home*) that the trouble will be overcome. The movement of the coin caused by the operation of boiling prevents burning quite as much as stirring will. Remember that the effect will be spoiled if any stirring is done.